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CONSUMERS' RESEARCH BULLETIN

General Bulletin Number

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This number is one of 4 *Bulletins* issued during the year by Consumers' Research which are not confidential. This *Bulletin* may be freely discussed with friends. We hope that you will use the opportunity to show them what CR is doing for consumers. ¶The *General Bulletin* is available not only to individuals, but to libraries, schools, and other groups, at $1 for the subscription year October through June. The next non-confidential issue will be the October 1939 number. ¶Responsibility for all specific statements of fact or opinion at any time made by Consumers' Research lies wholly with the technical director and staff of the organization. ¶Please send notice of any change of address at least two weeks before it is to take effect, accompanying your notice with statement of your previous address. Duplicate copies cannot be sent to replace those undelivered through subscriber's failure to send advance notice, except at the regular price for orders of such material as back issues. N.B.—For a detailed account of CR's early history, policies, and information as to the answering of special inquiries about commodities, subscribers are urged to read the *Introduction to Consumers' Research*, which is sent to anyone without charge.

Symbols used to indicate sources of data and bases of ratings:

A—recommended on basis of quality.
AA—regarded as worthy of highest recommendation.
B—intermediate with respect to quality.
C—not recommended on basis of quality.
cr—information from Consumers' Research's own tests or investigations.
1, 2, 3—relative prices, 1 being low, 3 high.
38, 39—year in which test was made or information obtained by the staff of Consumers' Research.

Off the Editor's Chest

It's the fashion in the early days of Consumers' Research for advertising men and magazine executives to poke fun at the consumer movement as a passing fad or as the sport of a few intellectuals, or of otherwise abnormal folk. As Consumers' Research and its influence among college and high school teachers, institutional purchasers, and consumers-at-large continued to grow at an ever-increasing rate, the advertising men's tactics changed. First they threatened to organize plans to combat the effect of consumer criticism and to force their critics with articles and advertisements poohpoohing the idea of testing and analyzing commercial goods. Failing in these attempts to discredit technical findings about goods, leading magazines next tried to get on the consumer bandwagon—a sort of take-the-ball-away-from-'em move. Several magazines, mail-order houses, and department stores set up pseudo-bureaus-of-standards.

Another technique is good-will work among consumers, as done by Mrs. Anna Steese Richardson, of the Crowell Publishing Company (*The American Magazine, Collier's, Woman's Home Companion, The Country Home Magazine*). Mrs. Richardson is a charming, grandmotherly sort of person and a diligent and effective advocate for national advertising. Recently writing for a trade paper and attempting to define the consumer, she said: "And don't you believe that the leaders of organized groups who are constantly getting their names and pictures in the newspapers represent Mrs. America, the common, garden-variety of consumer. They do not. They don't even rub elbows with her. They are platform personalities with political ambitions. Mrs. America is too busy running her home and raising her children and serving her community to make speeches or give out interviews."

We were impressed with Mrs. Richardson's penetration. But as we read on, we came upon her utter distaste for any service that tests and rates commodities—particularly when some are found not worthy of recommendation. "Unquestionably," she continued, "the consumer has the right to know what she is buying;...The question is this: Who is best equipped to give her this information? The manufacturer and retailer who spend millions to test products or the head of a consumer group who maintains a small laboratory *in an obscure village...*?" [Italics ours—CR.]

It is truly amazing that an associate editor of a national magazine which lives by the sales of its advertisers to people in every town, village, and hamlet should appear to sneer at an "obscure village" or to hold it to be a term suggestive of incompetence or lack of influence on the part of people carrying on their work in it.

Is it possible that Mrs. Richardson would scoff at some of our great manufacturing concerns whose plants and laboratories, like those of many of the greatest universities, are situated in "obscure villages" pleasantly remote from advertising men, as well as from the consumer politicians she refers to? Does she not know that these same small-town laboratories are carrying on the most important pioneering technical and scientific work that is being done anywhere? Or would she dismiss them contemptuously along with Mr. Edison's epoch-making laboratory at Menlo Park, the Mayo Clinic at Rochester, Minnesota, laboratories of great national oil refining companies in small towns in eastern states and in Oklahoma, or the Bell Telephone System's numerous rural laboratory stations?

Let us grant the *ability* of the researchers of large manufacturers to give technically dependable information about their products. But why should anyone, at this long interval after the publication of *Your Money's Worth* and *Skin Deep*, and in view of the ever-widening scope of the consumer movement, be so naive as to assume that manufacturers will be *willing* to undermine the work of their advertising men and million-dollar appropriations by giving consumers dependable and unbiased, favorable and unfavorable, information about their commodities? (Whether their laboratories be small or large, in the midst of country fields and orchards, or wedged into the middle of Chicago's Loop.) Had you forgotten, Mrs Richardson, that goods are sold in your company's magazines and all others, on *favorable* claims and tests only, never by published comparisons of advantages and *dis*advantages of the competing articles?

It is obvious to all who know anything about consumers' goods that with respect to the laboratory facilities of the big manufacturers so approvingly referred to by Mrs. Richardson, the question is not as to the existence of the laboratory or of numerous bespectacled gentlemen in white coats, but as to what use is made of their findings in the designing and manufacturing of the products. People have learned that the *Woman's Home Companion* and *Good Housekeeping*, and all their advertisers combined, fall far short of providing the information consumers need. CR's subscribers will not need to be told that manufacturers and retailers do not give or even try to give unbiased, technically reliable, comparative ratings on the goods consumers buy, of the sort CR reports, month by month, in the pages of its *Bulletin*. Such information is not found in any other place whatever—and least of all in the popular home magazines, that can survive only by keeping the favor of national advertisers and advertising agencies.

F. J. S.

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Going to the New York Fair?

IT is difficult, of course, to sum up the New York World's Fair in a few words and for people of varied interests, but the reports we have heard have, on the whole, been favorable (though not unqualifiedly so).

FOR those of our subscribers who may be planning to go to the New York World's Fair,[1] CR is glad to offer a few suggestions concerning restaurants and hotels. What follows is, of course, at best only a very fractional list, and many excellent restaurants and hotels have doubtless been omitted. Nevertheless, we hope the names given will have value to all who are unfamiliar with New York and its facilities. ¶We should perhaps add a word of explanation in connection with the list of restaurants which follows. We have tried to pick those that can usually be depended upon to serve superior food. However, unless one has time to look up neighborhood restaurants far outside the theatre and hotel district, really first-class food and service in New York City are expensive—as visitors to the Fair will all too soon discover—sometimes bringing twice as high a price as exactly the same quality obtainable in a smaller city. But please don't blame us for the prices charged! We realize they may well seem outrageous to persons familiar with good eating places in small towns.

New York Restaurants Featuring European Cookery

French:

Maurice Raviol, 3 East 48 Street.

Armando, 54 East 55 Street. Small, and expensive; may be crowded. Very good food.

Longchamps. Consult telephone directory for addresses of 12 branches. Feature fresh (not frozen) and fresh-cooked foods. Service charge in lieu of tipping.

Buchler, 814 Lexington Avenue.

Robert, 33 West 55 Street. Fine food, but expensive.

Henri, 40 West 46 Street. Expensive.

Zimmerman's Hungaria Restaurant, 163 West 46 Street. French cooking. Though inexpensive ($1 up), has excellent floor show.

Petitpas, 317 West 29 Street. Inexpensive.

Swedish, with usual smorgasbord:

Kungsholm, 142 East 55 Street.

Rathskeller, 201 East 52 Street.

Wivel, 254 West 54 Street. (Features a floor show: likely to be crowded.)

Also the following:

Cavanaugh's, 258 West 23 Street. An old-time New York restaurant.

Keen's English Chop House, 72 West 36 Street.

Luchow's Restaurant, 110 East 14 Street. An old-time New York restaurant.

Butler Hall, 400 West 119 Street. (Near Columbia University.) Moderately priced compared with three preceding restaurants.

Stouffer's Restaurants, 540 Fifth Avenue, and 42 Street and Park Avenue. Said to have same management and standards as Stouffer's in Philadelphia, but prices slightly higher.

Fraunces' Tavern, 54 Pearl Street. An historic old New York restaurant. Excellent food; prices reasonable.

Restaurants On Your Way to New York

Stouffer's Restaurants, 215 South Broad Street, and 1526 Chestnut Street, Philadelphia. Inexpensive, but excellent food, freshly cooked, in the manner of the most expensive restaurants.

Bookbinders Seafood House, 215 South 15 Street, Philadelphia. Especially good sea food.

Old Ferry Inn, at Delaware River bridge, Washington Crossing, Pa.

The Old Sun Inn, Bethlehem, Pa.

The William Penn Inn, Gwynedd, Pa. (22 miles north west of Philadelphia, on U.S. Highway 202).

Twin Grill, Scranton, Pa.

The Old Heidelberg, Swiftwater, Pa. In attractive Pocono mountain country. (On U.S. Highway 611, between Scranton and Stroudsburg.) German cooking.

The Village, Lancaster, Pa. (Lancaster is on the Lincoln Highway.)

Hotel Fauchere, Milford, Pa. (on U. S. Highway 6).

In northwestern New Jersey:

Cochran House, Newton, N.J. (on U.S. Highway 206).

De Cleene's Clinton House, Clinton, N.J. (on U.S. Highway 22).

In north central New Jersey:

Day's Restaurant, second floor, 40 Park Place, Morristown, N.J. (on U.S. Highway 202).

Hotels

New York hotel rates, already high, have been raised recently, partly on account of extremely high labor costs, and also because of expected World's Fair business. First-class hotel rates are $6 or more for one person, $9-14 for two. Lower-priced hotels (in the main, as good as the best hotels in most smaller cities) charge $3-5 for one person, $4-8 for two. If you're not used to city noises and taxi horns with your sleep, better ask for a room high

[1] Those of our subscribers who have long been familiar with CR's work and who are well aware of the great pains we have always taken to avoid even the semblance of "entangling alliances" with commercial interests, will not be surprised to find that CR has no exhibit at the Fair. They may, however, be interested to know that some time ago there was formed a grandiose, so-called "Advisory Committee on Consumer Interests of the World's Fair, 1939, Inc." (actually a group representing such widely divergent interests as agents of the cooperatives, New Deal and left-wing and labor variants of the consumer movement, representatives of trade associations, advertisers, retailers, and publishers). After two years of wrangling and naive but ineffectual planning for a non-commercial exhibit at the Fair, some of the members resigned in a body because they learned only too late what anyone with experience in representation of consumers through such agencies could have told them beforehand, namely, that the use of their names might "lead consumers to the false conclusion that representation has been accorded their interest in the planning and execution of exhibits."

Another and more fundamental reason for CR's lack of participation in the Fair is that we take the stand—and we feel sure our subscribers will concur with our view—that all available funds should be spent for the enlargement and improvement of our testing facilities (thereby directly serving *all* our subscribers), rather than in assuming large contractual obligations for expensive promotional devices of dubious ultimate benefit to them (or to anyone else but Mr. Whalen's Fair and New York City's business interests). At the present stage of the very young Consumer Movement, what consumers most need to know is which electric range, refrigerator, motor gasoline and oil, etc., to buy for best service and economy. They do not particularly need to be shown by means of impressive exhibits that the refrigeration or petroleum or radio industry is big and rich and can afford to put on an interesting show—building up prestige, instead of cutting down prices.

up, or specially emphasize a quiet side, or court. Some hotels of the moderate-price class that can be recommended are:

Martinique Hotel, Broadway & 32 Street. (Convenient.)
Prince George Hotel, 14 East 28 Street. (Caters especially to quiet, mannerly clientele. Exceptionally spacious and comfortable public rooms.)
Brevoort Hotel, Fifth Avenue & 8 Street. Rooms and meals reasonable.
Lafayette Hotel, University Place & 9 Street. Rooms reasonable. Meals expensive, though superior.

Hotels of the big and busy kind:

McAlpin Hotel, Broadway & 34 Street. (Convenient.)
Roosevelt Hotel, Madison Avenue & 45 Street.
Biltmore, Madison Avenue & 43 Street.

New Report on Oil Burners, Boilers Suitable for Use with Oil Burners, and Combination Boiler-Burner Units

New reports bringing up to date and greatly expanding the information on these subjects, which are of vital importance to many subscribers, are nearing completion. The large amount of work involved in preparing a careful study of so difficult a subject made it impossible to issue the findings now, in our last monthly *Bulletin* before fall. For the benefit of those CR subscribers who may require this information before then, to help them in buying or planning the purchase of an oil burner, and who, we believe, will be willing to bear the extra cost of preparing the report, we will provide, if a sufficient number of requests are received promptly, accompanied by remittance, a mimeographed interim *Special Bulletin* at 25 cents (stamps acceptable). This issue will be confidential and available only to current subscribers to CR's combined service. In somewhat revised and perhaps condensed form, the substance of this *Special Bulletin* will, it is expected, appear in our regular monthly *Bulletins* around November or December 1939. ¶Reports on stokers and other heating equipment will follow, according to present plan, but are expected to be available only in the monthly *Bulletin* series.

Mechanical Refrigerators

THIS year's tests of mechanical refrigerators by Consumers' Research show a difference in operating costs, between the most and least efficient 1939 electric refrigerators tested, of approximately $1 per month at average rates charged for electricity. The findings nicely illustrate the relative unimportance of first costs on many items purchased by consumers, for the most efficient refrigerator co-ts initially $50 more than the least efficient one, yet after four years of operation, it would become the least expensive of the group even if it did not offer the likelihood of a greater total number of years of service life. At high electric rates, the difference in operating costs will still more favor the higher-priced refrigerator and it is only at exceptionally low electric rates, say 2 cents or 2½ cents per kilowatt-hour, that the less efficient refrig rator would, assuming an equal service life, be as economical a purchase as the most efficient and more costly one.

Even the consumer who has a good refrigerator is going to be urged more and more to get a new, and supposedly better, one. "The refrigeration industry will attempt to persuade owners to accelerate their replacement," as one business magazine put it, "just as the automobile industry has been doing successfully for years." As a matter of fact, you may be justified in exchanging your old refrigerator for a new one, as the salesman would have you do, if you are sure that the new one has been found by test to consume a comparatively small amount of electricity. (A simple test with a kilowatt-hour meter will suffice to determine, if you have any doubt, whether the refrigerator you now have consumes an unusual amount of current.) If you live in a region where electric rates are not unusually low, purchase of the new refrigerator, if it is very efficient, may save something like $1 to $1.50 a month on the electric bill, a sum sufficient to balance the cost of depreciation of the new refrigerator figured at 10 percent per year.

As to the choice between a good electric refrigerator and a gas refrigerator, that depends upon local rates for electricity and gas, and in any community where electric rates are rather high, or gas rates exceptionally low, the problem will bear careful looking into by any consumer wanting to make an economical selection. The gas refrigerator will be more expensive to buy; and, in most localities, it will also be more expensive to operate by a factor of possibly two to one. It has definte disadvantages, too, for any family which is likely to move from one apartment or house to another.

As to the advertising claims made for 1939 refrigerators, the consumer must remember that the industry now considers itself in its "replacement phase of development," and industries in replacement phases go in for lavish advertising of sales features of new models, whether these features be important or not, in order to prevent prices from taking their natural decline when research, development, and factory tooling costs have been covered. (As with automobiles, if designs were stabilized, and new claims for grandeur, luxury, and the like, were not invented, prices would tend to decline rapidly because consumers would tend to stay out of the market, wearing the product out before buy-

ing again.) This year's big new advertising development is the *Frigidaire Cold Wall*—the "New! Amazing Discovery," the "Sensational New-Type Refrigerator," the "modern food-keeping miracle," etc., etc. It is not an accident, of course, that the new "food-keeping miracle" costs more than last year's refrigerators. (Now presumably antediluvian?) Advertisers of competing brands, naturally, have had to scurry around and discover for their own products something which could be similarly ballyhooed. *General Electric* hit upon "Selective Air Conditions." Stewart Warner suddenly produced an "Amazing 'Humidified Cold' Compartment." *Norge* put out "the new and amazing C/M *Synchronizer*" claimed to keep foods "juicy fresh twice as long." The particular advantage claimed for the *Cold Wall* refrigerator is that it will store foods "days longer than ever before." It will seem doubtful to many readers, and it seems very doubtful to CR, that the average housewife will *wish* to store foods "days longer" than she has been able to do right along with any good electric refrigerator. Storing foods was pretty well done, if only a little care was taken, in the backward, horse-and-buggy days of a year ago (consumers who remember advertising —as few do—may recall that refrigerators were claimed to be practically miracles in 1938, too).

The operating cost of the *Cold Wall* may in some cases be somewhat higher than that of the conventional *Frigidaire* refrigerator (because of being run at a lower average temperature), according to information reaching CR. The housewife who is overawed by the advertising pictures showing shriveled peas (or are they blueberries?) kept several days in the wrong kind of refrigerator (that is, not a *Cold Wall*), should remember that the miracles of food preservation provided by the *Cold Wall* can be achieved in other refrigerators by no more trouble than keeping such stored items covered. But you won't see any *Frigidaire* advertising: "Cover your food and save $75."

One who wishes to compute for his own particular circumstances the comparative cost of operation of the 1939 refrigerators tested by Consumers' Research can do so easily from the data given in the following table. It must, of course, be remembered that operating costs will vary in different homes, depending upon how a refrigerator is used; for instance, as CR has pointed out in a previous report, keeping the inside temperature at 40°F instead of the more reasonable figure of 44°F may increase the cost of operation as much as 35 percent. Operating cost also depends upon the amount of ice made—ten pounds of ice consuming about 2½ to 5 cents' worth of electricity. In the table given, the first figure for monthly cost is the experimentally determined cost for operating a refrigerator without opening its door in a room maintained at the constant temperature of 70°F; the second figure is the cost for a month when the room temperature is raised to 80°F, and the third figure is the cost for a month when the room temperature is raised to 90°F. The temperature inside each refrigerator was 38°F at 70°F room temperature, and rose to 43°F at 90°F room temperature. It has been learned by experience that the cost of operating a refrigerator loaded with food and used under average conditions in a home will often be close to the figures in the second column, as shown in Table I, and usually will not exceed the figures in the third column (assuming a cost of 5 cents per kilowatt-hour for electric current). Differing from preceding years, the refrigerators tested in 1939 were 6-cubic-foot models (now the most popular size).

TABLE I

A comparison of operating costs per month of 1939, 6-cubic-foot refrigerators. The electric rate is assumed to be 5 cents per kilowatt-hour.[1]

	Room Temperature in Degrees Fahrenheit		
	70°	80°	90°
General Electric Thrifty Six	$ .80	$1.10	$1.45
Frigidaire Super-Value 6-39	.95	1.30	1.70
Crosley LA9-60	1.25	1.65	2.05
Montgomery Ward Model 60	1.35	1.75	2.20
Coldspot, Cat. No. 22—3380	1.90	2.15	2.45
Electrolux Gas Refrigerator *The Duchess*, K-600 (at 6.82c per therm, a common natural gas rate, equivalent to a gas of 1100 Btu per cu ft at 75c per 1000 cu ft)	.55	.75	.95
(at 23.2c per therm, a low rate for city gas [manufactured, not natural] equivalent to a manufactured gas of 540 Btu per cu ft at $1.25 per 1000 cu ft)	1.90	2.55	3.20
(at 40c per therm, a low rate for bottled gas, equivalent to 8.6c per pound of propane)	3.30	4.40	5.50

(One therm is 100,000 British thermal units.)

[1] Approximate operating costs at other rates may be computed by simple proportion. For example, if you pay on the average 6 cents per kilowatt-hour for electricity the operating cost per month of the *General Electric Thrifty Six* becomes at 80°F: 6/5x $1.10=$1.32. Similarly if you buy gas at the rate of 15 cents per therm, the operating cost per month of the *Electrolux Duchess* becomes at 80°F: 15.6.82 x $.75 = $1.65.

The refrigerators which CR purchased for test

were, as in previous years, the lower-priced "economy" models. These lack a few of the gadgets of the more expensive models but, in general, have the same refrigerating mechanism and cabinet. Whether one should pay $20 or more for the "extras" is a matter for the individual to decide for himself after he has considered them in relation to his own particular needs—and pocketbook. The industry follows the practice common in the automobile trade and pushes the higher-priced models even to the point, in some localities, of not revealing the existence of lower-priced models. Prices in different localities may differ somewhat from those given in the listings. ¶The refrigerators were bought by CR, with the exception of *Electrolux* K-600 and the Montgomery Ward Model 60 refrigerators; these two random-selected samples were loaned to CR for the period of the test. Tests of some brands previously reported on were not repeated this year, in order to make it possible to test other refrigerators which are of interest to many subscribers as shown by their letters. ¶The 1939 refrigerators in this report were tested according to the standard procedure described in *Household Electric Refrigerator Standards* of the National Electrical Manufacturers Association. The room temperatures ranged from 70°F to 110°F. Dimensions were determined in accordance with the NEMA recommended standard method for computing dimensions, revised 1938. In addition, the refrigerators were given an endurance test under severe conditions of temperature and relative humidity for a period of sixty days, and the interior porcelain enamel was tested for resistance to staining by food acids. Efficiency was well maintained by the refrigerators during the endurance test. Except as noted in the listings, there was no staining of the porcelain enamel. Refrigerating capacity (cold-maintaining ability under severe conditions) was judged adequate with the possible exception of the *Electrolux*. Thermostatic controls were judged satisfactory in all cases. ¶All the 1939 refrigerators had a device to assist in releasing the ice trays; *Frigidaire* and *Electrolux* besides had aluminum quick-release grids in all trays, and Montgomery Ward had a quick-release in one tray and rubber grids in the other three trays. These three refrigerators also were the only ones tested which had automatic-return defrosting controls. All refrigerators tested were equipped with drip trays and all had three ice trays except the *Electrolux* and the Montgomery Ward, which had four. Further equipment is mentioned in the listings. Hazards of the various refrigerants were discussed in CR's May 1934 *Handbook*; that discussion is still up to date. Ratings of a few important brands tested in 1937 or in 1938, but not in 1939, have been briefly repeated as indicated in the listings, for the convenience of the reader. Ratings are cr 39 except as noted.

A. Recommended

Frigidaire Super-Value 6-39 (Frigidaire Corp., Dayton, Ohio) $149.75. 6 cu ft capacity, 11.4 sq ft shelf area. Sealed compressor, rotary type. Second lowest in cost of operation of electric refrigerators tested. Quiet in operation except for a hum when starting up. Refrigerant was dichlorotetrafluoroethane. ¶Features of the next higher-priced model, *Frigidaire Special 6-39*, $179.75: slightly larger storage space and shelf area; more elaborate cabinet, but the same mechanism as the model tested; four ice trays instead of three; froze eight pounds of ice instead of six; had one covered vegetable pan, a thermometer, and automatic interior light. ¶The new, widely advertised *Frigidaire Cold-Wall Dulux 6-39* has two food compartments, an upper and a lower one, separated by a glass plate. The lower compartment is cooled by coils in the wall and bottom of the refrigerator through which brine circulates; its design is such as to cause less drying out of the foods stored in it. A brief check test was conducted to arrive at an estimate of the comparative operating costs; in this limited test, costs for current were found to run fairly close to the figures for *Frigidaire Super-Value 6-39*. ¶(The *Cold-Wall* model was not subjected to the full series of tests given to the other 1939 refrigerators; no indication can be afforded at this time of *Cold Wall's* continued good performance in service.)

General Electric Thrifty Six LB6-39-A (General Electric Co., Cleveland) $149.50. 6.4 cu ft capacity (0.3 cu ft larger than advertised), 11.8 sq ft shelf area. Sealed compressor, reciprocating type. Lowest in cost of operation of the electric refrigerators tested. Quiet in operation. Refrigerant was sulphur dioxide. This model and the *Hotpoint* 120-EA-63 ($149.50) have the same dimensions and are similar in most respects, including mechanical elements. The *Hotpoint*, however, has a fan-cooled tube and fin condenser; the *GE* has a natural-draft-cooled plate condenser. The General Electric Co. will possibly give information on the relative current-use efficiency of the two brands, upon written inquiry by subscribers. ¶The next higher priced *General Electric* model was the *JB6*, $189.50. Features: same volume of storage space, and the same mechanism as the model tested, a more elaborate cabinet, and somewhat greater shelf area; four ice trays instead of three; froze eight pounds of ice instead of six; had one covered vegetable pan, a thermometer, and automatic interior light.

Gibson S-57, $159.50. cr 37

Hotpoint 120EB51, $159.50. cr 37

Westinghouse HS-52, $167. cr 38

B. Intermediate

Crosley Shelvador, LA9-60 (The Crosley Corp., Cincinnati) $137.50. 6.6 cu ft capacity (0.6 cu ft larger than advertised), 14.9 sq ft shelf area (including the shelf area of the racks in the recessed door). Sealed compressor, reciprocating type. Cost of operation about 50% higher than for *General Electric Thrifty Six*. Quiet in operation. Refrigerant was dichlorodifluoromethane. Equipped with wire rack in door for holding small articles. ¶The next higher-priced model, *Crosley LB565* ($179.50), had a different cabinet and a somewhat different sealed unit from the model tested.

Grunow 53W, $149.50. cr 37

Kelvinator KS6-38, $182.95. cr 38

B. Intermediate (contd.)

Leonard LS-50, $156.25. cr 37

Montgomery Ward & Co., Model 60, De Luxe. $149.95 retail store. 6.6 cu ft capacity, 14.7 sq ft shelf area (0.7 sq ft larger than advertised). Open compressor, reciprocating type. Cost of operation about 60% greater than for *General Electric* model tested. Slight noise, but judged not objectionable. Considerable vibration of mechanism while running—about 3/16 in. Refrigerant was dichlorodifluoromethane. Equipment included a thermometer, a water jug, and a covered, enamelware drawer in bottom of food compartment. Molded plastic handle of drawer in food compartment broke the first time the drawer was pulled open because one of the attaching screws lacked threads. ¶Models 640, 622, and 760, carried in retail stores, and models 1640, 1622, listed in the mail-order catalogs, are claimed by the company to have operating cost comparable to *Model 60*. They differ in equipment and style of cabinet. Note that retail store models average about $10 to $17 (without considering cost of freight on mail-order models) higher in price than corresponding mail-order models.

Norge, S-52-8, $169.95. cr 38

Servel Electrolux, The Duchess, K-600 (Servel Inc., Evansville, Ind.) $259.50. 5.7 cu ft capacity (0.3 cu ft less than advertised), 11.8 sq ft shelf area (0.6 sq ft less than advertised). Absorption machine driven by the heat of a gas flame. Cost of operation using natural city gas, 6.8c per therm (see Table I)—about 30% less than for *General Electric Thrifty Six* at 5c per kilowatt-hour; using manufactured city gas, 23.2c per therm—over twice that for *General Electric Thrifty Six*; using bottled gas, 40c per therm—about four times that for *General Electric Thrifty Six*. (Price of gas, in order for *The Duchess* to be equal in economy to the *General Electric Thrifty Six* with electricity at 5c per kilowatt-hour, should be approximately 10c per therm, which is equivalent to 540 Btu manufactured city gas at 55c per 1000 cu ft and 1100 Btu natural city gas at $1.10 per 1000 cu ft.) Quiet in operation. Refrigerant was ammonia (differing from model tested in 1938, in which both ammonia and methyl chloride were used). Refrigerating capacity at high room temperatures was inadequate (a fault not found in the model tested in 1938). Temperature in cabinet rose to 49°F with the coldest setting of the dial when the room temperature was 110°F. Equipment included a thermometer and two covered metal drawers at bottom of food compartment. ¶Features of the next lower-priced model, *Servel Electrolux K-600A, The Baroness*, $219.50: same mechanism, same storage space, shelf area, and number of ice trays; lacked quick-release grids in ice trays, metal drawers in food compartment, interior light, semi-automatic defrosting, and a few less important refinements.

Stewart Warner, C-700, $159.50. cr 37

C. Not Recommended

Coldspot, Cat. No. 22—3380 (Sears, Roebuck & Co.) $99.50 plus freight. 6.4 cu ft capacity, 12.2 sq ft shelf area (0.8 sq ft greater than advertised). Open compressor, rotary type. Cost of operation about double that of the *General Electric Thrifty Six*. Refrigerant, sulphur dioxide. Door of refrigerator did not close tightly at one corner, and left an opening through which air could leak unless the door was slammed vigorously. Electric switch controlling light in cabinet did not function until repaired; before that light burned continuously. Due to a manufacturing defect, door to evaporator did not operate properly, as received. Grapefruit juice caused slight staining of interior enamel. Equipment included one covered, enamelware drawer and one open wire drawer at bottom of food compartment. ¶Features of the next higher-priced models, Cat. No. 22—3368 ($114.50), and Cat. No. 22—3370 ($129.50): same mechanism, same thermal insulation; somewhat more elaborate cabinets.

Acknowledgment of Invaluable Aid

WE wish to acknowledge in this, the concluding issue of CR's Volume V, our extensive indebtedness to the many expert consultants of CR for their extremely valuable services on this and previous series of *Bulletins*. These services by acknowledged experts have, for the most part, been given either without charge or at extremely modest rates, and we feel it impossible adequately to express our gratitude to these men and women who have given so unstintingly of their time and knowledge for the benefit of CR subscribers, and for the advancement of the science and technics of testing of a wide range of consumers' goods.

Subscribers will be interested to know that our list of available consulting experts now numbers well over 1000. At their own request many of them must remain nameless in our *Bulletins*. On behalf of our subscribers, we extend grateful appreciation to these consultants whose help has made possible the success and steady growth of CR in knowledge and capacity. We also wish to thank those consultants who have volunteered their services which we have not as yet had occasion to use, but which we hope to avail ourselves of effectively in the near future.

Our thanks are also due to the many subscribers who, with careful attention to detail, have written letters of criticism and suggested needed corrections or changes, and to others who have given direct practical assistance in purchasing samples for test, in various parts of the country remote from Washington—West, Middle West, South, and North. Their help has been most valuable; the purchasing group has made possible a much wider coverage of the national market than would otherwise have been economically possible.

THE STUDEBAKER CHAMPION

ONE consultant regards the design and construction of this new car as a milestone in American automobile history. It should give the "Big Three" (*Ford*, *Plymouth*, and *Chevrolet*) enough serious competition to make them realize that a large proportion of the public really desires an automobile capable of good *and economical* performance. The public too long has had to manage with cars of conventional, heavy design except for the substitution of a low-powered engine. Such cars (e.g. *Ford 60*), though capable of giving better economy, have not fully satisfied drivers because of their dislike for shifting gears and their habituation to cars with a much higher power-weight ratio. Studebaker, in seeking to provide an economical car principally by the method of weight reduction, appears to have taken a step in the right direction for the American market. This method permits the attainment of good "performance" (hill-climbing, speed, and accelerating ability) by maintaining the power-weight ratio of the heavier cars.

Most drivers associate light cars with poor riding qualities, an objection that should not apply to the *Champion*, for a sizable proportion of the weight saved is unsprung weight, making for well-cushioned riding. The *Champion* is approximately 500 pounds lighter than the average of the *Ford*, *Plymouth*, and *Chevrolet*. This approximate 20 percent weight reduction, *with correct carburetor adjustment, manifold design, and driving practices*, should result in real operating economies, and it seems that Studebaker's claims of 10 to 25 percent greater economy are at least possible. On the other hand, there is the question of whether the potentialities of greater economy may not be lost by a tendency of dealers to recommend and consumers to use premium gasoline in the engine in order to give it a performance which would seem favorable in comparison with larger and heavier cars.

Because the *Champion* is a "medium-sized" car, it should better suit the American taste than little cars or midgets like the *Bantam* and the new *Crosley*. Subscribers above normal stature who may be interested in the *Champion* will wish to pay particular attention to its interior dimensions and driving comfort; one consultant considers the car "a bit on the small side."

It is important to note that there will be a certain element of risk in purchasing the *Champion*, as is the case with all new, untried products (see CR's February 1939 *Bulletin*, p. 22, re *Bendix* washing machine). The American consumer is too prone to forget that in all new products, particularly as complex an article as a modern automobile, there is always the possibility of "bugs" quite unexpected by the manufacturer, appearing in actual use. However, so far as can be judged at the present writing, there is no particular reason to expect trouble with this car. Only time can tell whether the *Champion*, with its lighter construction throughout, a power plant with rather high revolutions per mile, relatively small ratio of connecting-rod length to stroke, with consequent high piston side-thrust and increase in rate of wear, will stand up as well in actual use as some of the older and more fully tried cars. On present information, this car appears to warrant a *B. Intermediate* rating. It would be expected that if the engine stands up well in service and no significant defects in the rest of the chassis or in the body develop in use, the rating might be changed to *A. Recommended*.

Price Group 4— $740 to $806

B. Intermediate

Studebaker Champion 6, G ($740 factory del'd plus $87, approximately, del'd N.Y.C.) 78 hp at 4000 rpm. 110-in. wheelbase. Over-all length 186 in. Weight, 2375 lb. Brake factor 40. No depreciation figure available, as this is a new car. Adequate generator, with voltage control. *Delage* front-wheel suspension. Full-length water jacket. Lowest-priced car on which overdrive and "hill-holder" are available. The "Standard" model with an overdrive ($45 extra) comes to about the same price as the de luxe without the overdrive and will give exceptional economy on long runs where the speed is regularly over 30 mph. The tires (5.50 x 16) are of adequate size to carry the car and its load. The average consumer will be well advised to resist the salesmen's recommendations of the de luxe model at approximately $60 more. It is doubtful that the added qualities are worth the extra price.

Corrections and Emendations to:

Consumers' Research Bulletin

issue of March 1939

Page 9 Sewing Machines: *White* Rotary. In third line of listing, delete phrase, "built-in motor."

Page 20 Home Building: Col. 1, lines 8 and 9, delete reference to *Mac-Mar* Steel Framing; production of this has been discontinued.

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issue of April 1939

Page 15 Roller Skates: *Flying Scout.* These skates are obtainable from regular dealers, as well as through rollerskating rinks.

BATHING CAPS

Too often it seems to make little difference whether one pays much or little for a bathing cap; even an expensive one is apt to tear or split during a gay afternoon in the water, and few of them do an effective job of keeping the hair dry if worn by an active swimmer who enjoys diving. They do hold the hair out of the way, however, and keep it at least partially dry. The heavy caps of a type and thickness of rubber which resist stretching often have a long life, but are found uncomfortable to wear by some. Gum rubber caps, usually comfortable to wear, sometimes show remarkable durability. The plain, lightweight, easily stretched Latex caps are comfortable and probably keep the hair as dry as any of the more complicated designs often sold as more effective in protecting the hair; these Latex caps, however, did not give indication of good durability in the tests just completed for Consumers' Research.

For these tests, 13 women's smart-looking bathing caps were purchased. As these had to be bought in the late winter in order to be reported in this *Bulletin*, it was impossible to include any of the 5- and 10-cent store caps which are on sale in the Northern states during the summer swimming season only. The department store cruise shops, various sporting goods stores, and the mail-order houses, however, yielded a fairly good assortment at various price levels and in several popular styles.

The chief deteriorating agents in the life of a bathing cap appear to be oxidation, action of sunlight, action of water, puncture by hairpins, snagging, and tearing. The test methods were devised to give accelerated deterioration of the rubber caps under certain controlled conditions related to normal use on the beach or in the pool.

Samples were subjected to oxidation in an oxygen bomb; resistance to action of sunlight was determined by exposure of the samples to the rays from a sunlamp for 48 hours; changes of color and loss of elasticity were evaluated after samples had been submerged in hot water (66°C) for 48 hours; the force necessary to puncture each sample under controlled conditions was measured in each case. Ratings of the various caps were made on the basis of the results obtained in these tests. Color changes due to the action of the sunlamp, though noted, were not included as a factor in the ratings since artificial sunlight is often more active in causing color changes than actual sunlight.

Several of the caps were provided with special sealing devices which were supposed to keep the water out. In attempting to judge the effectiveness of these seals it became clear that so much depended on the care taken in putting the caps on, that no evaluation of their relative water-tightness could be taken into account in the ratings. It was judged, however, that several of the sealing devices might have real merit if the caps were put on properly.

Ratings are cr 39.

A. Recommended

The caps rated *A* gave excellent performance in all tests except in minor respects as noted.

Wards Molded Rubber, Cat. No. 911—4736 (Distrib. Montgomery Ward & Co.) 25c plus postage. A medium-weight cap. Seal judged rather ineffective. **1**

Tank Cap, No. 1257 (Seamless Rubber Co., New Haven, Conn.) 45c. A pure gum unornamented cap for tank and diving use. Did not come down far enough on the neck to make a good seal. **2**

Aviator, No. 7313-5 (Seamless Rubber Co.) 50c. A medium-weight cap. Color (green) faded during the accelerated immersion test. Seal judged moderately effective. **2**

U.S. Howland, No. 1631 (U.S. Rubber Products, Inc., 1792 B'way, N.Y.C.) 53c. (See following listing.) **2**

U.S. Howland, No. 1636, Cat. No. 38—602 (Distrib. Sears, Roebuck & Co.) 49c plus postage. Identical with No. 1631 except for pattern of embossing and unimportant differences in sealing devices; both of the latter were judged satisfactory. **2**

Olympic Sava-Wave, No. 536 (I. B. Kleinert Rubber Co., 485 Fifth Ave., N.Y.C.) $1.25. Seal judged very effective. **3**

B. Intermediate

The caps rated *B* performed satisfactorily in all tests except as noted.

Dri-Lined, No. 368 (I. B. Kleinert Rubber Co.) 50c. Resistance to puncture was low. Seal judged fairly satisfactory. **2**

Howland Velvetex, No. 1901 (U.S. Rubber Products, Inc.) $1. Had rather poor resistance to water action in accelerated immersion test. Seal judged satisfactory. **3**

C. Not Recommended

Latex, No. 1180 (I. B. Kleinert Rubber Co.) 25c. Unduly susceptible to puncture and discoloration. **1**

Latex, No. 7208 (Seamless Rubber Co.) 25c. Unduly susceptible to puncture; seriously damaged by sunlamp. **1**

Latex (International Latex Corp., Playtex Park, Dover, Del.) 50c. Poor performance in all tests except the oxidation test (in which some discoloration developed). **2**

Faultless, No. 105 (Faultless Rubber Co., Ashland, Ohio) 45c. Poor performance in three of five tests. **2**

Howard's Ideal. (Ralph M. Piper, Marysville, Ohio) $1. A pure gum tank cap. Unduly susceptible to puncture and rays from sunlamp. **3**

More Tools For The Home Workshop

Butt and Firmer Chisels

THE blade of a wood-cutting chisel should be made of good steel and have a hardness between 56 and 66 on the Rockwell C scale, as given by Federal Specifications. It should be smoothly finished. Chromium plating, not mentioned in the specifications, is desirable as a protection against rusting. The handle should be made of well-finished, straight-grained hickory, and be shellacked or varnished; it should be made so as to fit well in a socket which with the blade forms a single piece of steel. The end should have at least three thicknesses of high-grade leather firmly secured to it to take the blows of a mallet. Firmer chisels (equipped with a handle suitable for striking with a mallet) which meet Federal Specifications must have a blade at least 6 inches long and a handle approximately 4½ inches long, both exclusive of the socket. None of the chisels in CR's test met the Federal Specification for length of blade, and only one had a handle of the required minimum length. Six of the chisels tested had sockets to receive the handle, and two chisels had square tangs which were inserted in round holes in wood handles—a comparatively weak and unsuitable construction. One of the two chisels having this faulty construction had a deceptive flared-out portion which would give the unsuspecting purchaser the impression that he was receiving a properly designed chisel having a socket for the handle.

Each chisel was tested and examined for compliance with the requirements of the Federal Specifications; each was also given a practical use test in cutting hard maple. The width of the cutting edge of all chisels was ½ inch. Unless otherwise stated handles were of hickory and had two layers of leather on the end to receive the blow of a mallet.

Ratings are cr 39.

B. Intermediate

Eclipse, Cat. No. 84—800 (Distrib. Montgomery Ward & Co.) 30c plus postage. Blade poorly finished and rusted easily. Met Federal Specification for hardness of blade but not for material of handle, which was ash instead of hickory. Performed well in practical use test. **1**

Buck Bros. (Buck Bros., Millbury, Mass.) 75c. One of two chisels having a tang instead of a socket for securing the wood handle to the blade. Lower portion of tang had a heavy shoulder; this rested against a heavy brass ferrule serving to protect the handle from splitting. Chisel was thinly plated with chromium. Met Federal Specification for hardness of blade, but handle was made of beech. Performed well in practical use test. **2**

Craftsman, Cat. No. 9—3691 (Distrib. Sears, Roebuck & Co.) 65c plus postage. Well finished, with chromium plating. Met Federal Specification for hardness of blade. Performed well in practical use test. **2**

Stanley, Red Handle (The Stanley Rule & Level Plant, New Britain, Conn.) 80c. Met Federal Specification for hardness of blade. One of two chisels tested which met Federal Specification requiring three layers of leather on end of handle. This chisel closely resembled in appearance the more expensive *Stanley* chisel listed under *C. Not Recommended*. **2**

Wards Master Quality, Cat. No. 84—813 (Distrib. Montgomery Ward & Co.) 63c plus postage. Met Federal Specification for hardness of blade, but handle was made of ash. Performed well in practical use test. **2**

C. Not Recommended

Steelcraft (Steelcraft Tool Company, N.Y.C.; distrib. F. W. Woolworth Co. stores) 20c. One of two chisels having a tang instead of a socket for joining of blade to handle. Had a deceptive flared-out portion closely resembling in appearance a genuine socket. Failed in most important respects to meet Federal Specifications, but handle was the only one of chisels tested which met specification for length. Performed poorly in practical use test. **1**

Red Diamond, No. H1 (Pexto & Wilcox, New Haven, Conn.) 75c. Failed to meet Federal Specification for hardness of blade. Performed poorly in practical use test. **2**

Stanley, Natural handle (The Stanley Rule & Level Plant) 90c. Failed to meet Federal Specification for hardness of blade. One of two chisels tested which met Federal Specification requiring three layers of leather on end of handle. **2**

Protective Treatment for Draperies and Curtains

WINDOW curtains, draperies, and other household fabrics may be protected from sulphurous fumes in the atmosphere by dipping or spraying them with a solution of borax and boric acid. Though often unsuspected by housewives as a cause of deterioration, it is a fact that the burning of coal, gas, and oil produces fumes which combine with moisture in the atmosphere to form acids that eventually ruin the fabrics in a home. The borax and boric acid treatment not only protects fabrics against this type of deterioration but also adds a worth-while fire-retarding effect. With most fabrics, the appearance is not affected. To mix the solution, use 7 ounces of borax and 3 ounces of boric acid in 2 quarts of hot water. If the fabric is water repellent, difficult to wet, a very small amount of *Dreft* (Procter & Gamble Co., Cincinnati) may be added to form suds. The fabric may be dipped in the solution or sprayed with it. Any iron should be used moderately hot in ironing the fabric after treatment. Although the essentials of the procedure are given here, the reader may wish to refer to the more detailed discussion given in *Fireproofing Fabrics—Farmers' Bulletin 1786*, 5 cents from Superintendent of Documents, Washington, D.C.

RAMMED EARTH CONSTRUCTION

WHILE research scientists are trying to develop an ideal building material and prefabricators are busy with the headache of mass distribution, many would-be builders need look no further than their own toes for a solution to the problem.

Rammed Earth, or *pisé* de terre, has been used as a method of building since primitive times. Structures of this material, which date far back into antiquity, are to be found in various parts of the world. (Most American examples date from the first part of the 19th century.) But only in the last few years have modern scientific methods of testing and investigation been applied to earth construction. The results of this research—together with the historical record—indicate such great advantages of quality, economy, and general applicability that they cannot be ignored. This method of building by tamping earth into smooth, hard, solid walls does not depend on unusual local materials or on special climatic conditions, as adobe does. Most common arable soils can be used for rammed earth construction, even in regions of heavy rainfall and as far north as the Arctic Circle. No soil should be used, however, without being tested to make sure that it falls in the range of mixtures that have proved to be satisfactory. There are home methods of making rough soil tests, but it is strongly recommended that, before building is started, a scientific test be made by someone technically qualified to pass on the soil. (South Dakota State College, Brookings, S.D., makes analyses of soil samples for building purposes at $2 per sample.)

Until very recently clay was popularly supposed to be a good material because it acts as a binder. Extensive tests carried on at South Dakota State College have shown that while a certain amount of clay or fine silt is necessary, the quality of the finished wall will vary in roughly *inverse* ratio to the percentage of colloids (fine, gluey material). Usable soils will have 15 to 30 percent colloid content with the remaining percentage graded from sand up to coarse gravel. If the soil on the site of the building itself is not suitable for tamping, it may generally be mixed with coarser or finer material to bring it within the broad limits needed for *pisé* construction. In most districts, it is not usually necessary to go far for any supplementary material that may be required. The desirable moisture content of a soil for building purposes depends on the particle sizes, and will run from 7 percent to 18 percent. This is usually close to ground humidity and can be adjusted by the simple use of a watering can if too dry, or by spading if too wet.

Subscribers are cautioned not to attempt a rammed earth building on the basis of the brief description of the technique given here. Any subscribers who contemplate this type of construction are strongly recommended to get in touch with someone who is familiar with the technique and can give them scientific and architectural advice on the subject. It is doubtful whether an individual, employing workmen at a fairly high wage who were unfamiliar with the technique, would be able to effect much saving on a small house over what frame construction would cost. Time and money would be wasted in organizing the work for the first time on an efficient basis. If, however, a group of people wished to build a rammed earth community and could contribute their own labor to the project during part of the year, a very large cash saving would result and they would be housed in buildings of excellent quality.

Great care should be taken in the design and construction of the foundations of a rammed earth building, since they are subjected to stresses not developed in other common types of construction. A good solid masonry foundation is essential. The top of the foundation is made the exact width to which the wall will be built—usually 10 to 20 inches. If a wooden floor is to be used the foundation may be corbeled out to receive the ends of the joists. The upper surface of the foundation should be thoroughly waterproofed before the first layer of the earth wall is rammed, in order to prevent continued dampness from capillary action.

A form similar to that used in concrete work, but smaller and more substantially constructed, is fastened to the top of the foundation. The earth is placed in the form in layers about 4 inches thick. Each layer is tamped down to half its original volume before placing a new layer. Since rammed earth has immediate strength, the form may be removed as soon as it is filled, and reset, either adjacent to or on top of the portion just completed, without any delay for hardening of the material. This makes it possible for work to proceed continuously with the use of only two or three small forms. One straight section 30 to 36 inches high and 5 to 10 feet long, plus a short corner section and possibly a T-shaped section, will suffice for a building of any size. Such an economy is impossible in concrete construction without employing expensive patented building methods.

The end of each section of wall is grooved by placing a two-by-four in the end of the form. As the adjacent wall is rammed, the earth forced into this groove knits the two sections into a monolithic mass. Interior as well as exterior walls may be built of earth. The top of the finished wall is leveled off with a cement protective cap, and a roof plate is bolted down in the same way that the sill of a frame house is bolted to the foundation.

A well-designed rammed earth building will be laid out in modules, or units, of the form size so that

window and door openings will fall at the end of a wall section. When this is not possible, the desired openings are blocked off in the form during construction, as it is difficult to cut through the full thickness of a wall after completion. Wooden window and door frames may be nailed directly into the earth jambs with cement-coated nails.

The finished wall presents a smooth, hard surface. Some soils may be left without protection on the exterior, while others require a coat of linseed oil, paint, stucco, or whitewash. Interior wall surfaces should be oiled, painted, or whitewashed to prevent dusting. If cost will permit, the interior wall surfaces may be roughened and plastered directly, without the need of furring or lath. Buildings are particularly attractive if the earth is left unfinished or given a suitable coating to harmonize with the surrounding country. (The type of coating to be used will depend upon the nature of the soil used in the building.) Unfinished walls are particularly striking where the local soil has a distinctive color. Clay pigmentation of dull reds, blues, greens, yellows, and black are found in different parts of the country.

Tamping or ramming is usually done by hand. It is no more physically tiring than digging. Hand tamps weigh 15 to 18 pounds and have variously shaped heads. The time required for mixing (if necessary), tamping, and changing forms may be figured at the average rate of 2¼ cubic foot of finished wall per man-hour of the whole crew. If mechanical tamping is used the work will go very much faster, but the overhead expense of an air compressor is a cash item that might be undesirable where labor costs are low.

Rammed earth is a permanent type of construction requiring small upkeep. The walls are more than strong enough to carry any normal load immediately after construction, and their strength increases with age. This increase amounts to about 45 percent between six months and two years of weathering. The crushing strength of rammed earth made from a favorable soil runs over 30 tons per square foot. Walls of this material are completely fireproof. Their thickness and cohesion minimize danger from hurricanes and other destructive natural phenomena. Their solid, monolithic character eliminates nesting places for rodents and cracks for entrance of wind and rain. They contain no material that would rot or attract termites.

The fact that the material is generally available near the building site at no cost and the walls may be erected by unskilled labor acts both as an advantage and a disadvantage. The advantage is that an excellent type of construction is available to people who can contribute their labor to an undertaking, but who cannot find the cash to finance even the most inferior conventional structure. The disadvantage is less obvious. Since there is no profit to be had for anyone but the occupant of the building, advertising campaigns of the patented building material manufacturers have left *pisé* in the dark. For this reason it is not a generally known method of construction, even among those who could benefit most from its use. It is without a commercial sponsor to conduct research and promote knowledge of the technique through the channels which are normally used for introducing new methods of construction and supplying information on improvements in old ones. Considering that the enormous national housing problem is among the very poor, many of whom are unemployed or only partly employed, and considering the difficulty of meeting this problem at current prices for other types of construction, one would think that the government might turn a trick for the building-consuming public by lending rammed earth a research-and-promotional hand. It makes elaborate and costly free tests for the sponsors of patent building systems and offers excellent advice on building methods that involve large purchases of lumber, brick, cement, and hollow tile. The record of its activities in rammed earth is as follows:

A Department of Agriculture Bulletin on the subject was hurriedly gotten out in 1926 but has never been revised to include the important scientific progress that has been made in analyzing soils and perfecting the technique during the thirteen years since then. In 1936-37 the Farm Security Administration erected, as an experiment, a group of seven rammed earth houses, each with barn and pump house. The cost was 12 to 12½ cents per cubic foot, unheated (this is permanent, insulated, fireproof construction). Seventy cents of each construction dollar went to labor (compared with 30 to 35 cents for labor in brick or frame houses). The buildings are in excellent condition, structurally sound, comfortable to live in and are much sought after by local families. In short the experiment was a complete success—but the FSA says "*no further construction of this type is contemplated.*"

Some method of construction along the lines of rammed earth would seem to be the logical means of solving that major share of the housing problems that falls in the low income brackets. The government could help to make this solution possible by (1) offering the same testing facilities for building purposes as it does for agricultural purposes; (2) giving advice on earth construction comparable to what it gives on problems of farm operation and maintenance, and on other types of construction; (3) carrying on research and experiments to determine how economical this method of building can be—under what circumstances it can be used for foundations, floors, etc.; and (4) by including rammed earth in its demonstration projects, so that local home builders could learn the technique and see the results. Such a program could easily be

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carried out through existing facilities. The objection that it would be in competition with the building industries does not hold water, since the greatest use of rammed earth would not be as a substitute for other building types, but as an opportunity for additional housing in cases *where the alternative is no new construction at all.* This would provide supplementary outlets for lumber and mill work, roofing materials, foundation work (at present), steel beams, plumbing, heating, electrical work, and household equipment. If a large number of consumers demanded that the government take an interest in the matter there might be some hope of action, but as it is now, few of those who need this knowledge have ever heard of rammed earth, and fewer still have any idea at all how effective and economical this method of construction is.

ROCKWELL KING DUMOULIN

Editors' Note: The figures at present available on thermal conductivity of rammed earth walls are not in satisfactory agreement, but they tend to show that thick rammed earth construction provides more favorable insulation values than more common types of construction. For example, South Dakota's State College Extension Service reports notably higher warmth in a *pise* poultry house than in a corresponding frame house, and a lower daily fluctuation of temperature during the five coldest months of the year. One figure for thermal conductivity, from the Bureau of Standards (which may or may not be near to a representative value for other samples of *pise*), is 2.4 Btu/hr ft^3 (deg. F/inch), for a sample of rammed earth wall (density, 110 lbs/ft^3—characteristics not further defined).

Important New Book on Consumers' Problems

Consumption in Our Society, by Elizabeth Ellis Hoyt. Published by the McGraw Hill Book Co., N.Y.C., 1938. 420 pages. $3.50.

THERE are, as every one knows, vogues in academic thinking as in all other kinds of thinking. At the moment there seems to be a preponderance of opinion among teachers of economics to the effect that the one sure way to save America from itself is to create a "planned economy." Many exponents of this general idea are, it is true, quite vague as to just what a planned economy would include. The degree of planning is also a matter of debate. But there is pretty wide agreement that individual initiative and private enterprise must, in the name of posterity, yield to an economic system created in large part by legislative fiat and administered according to blueprint specifications.

Whereas the average teacher was once conservative to a fault, the current tendency is to embrace the opposite extreme by adopting the latest economic innovations with a minimum of critical appraisal. As a result it is now, in many quarters, tantamount to academic heresy to oppose or criticize the blueprint concept of social and economic organization. And nowhere is this more true than in consumption economics where, for a decade at least, the businessman has been considered incurably dishonest and the government bureau the knightly defender of the consumer's rights. Viewed in the light of these conditions, Elizabeth Hoyt's *Consumption in Our Society* is a remarkable book. For in this study Miss Hoyt abandons the orthodox lines of argument and proceeds to inspect the consumer's position with refreshing candor. The result is a worth-while appraisal of prevailing institutions and an evaluation of consumer goals that do credit to this nationally known consumption economist.

Among other things, Miss Hoyt approaches the planning fetish with a healthy skepticism. While she admits that the advantages of free private enterprise sometimes come slowly, she yet contends that "competition...functions, on the whole, better than the government would function" simply because "consumers have more power to express themselves on the market than they have through votes." This argument rests, by the way, on a premise that many modern liberals reject, viz., that consumers are better judges of what will yield them satisfaction than any group of planners could be. Interestingly enough the modern liberal position, which would confine consumption to those items approved by "experts" and produced under planned conditions, runs directly counter to the principal tenet of earlier liberals. For it used to be argued that the right of the consumer to be served by freely competing producers and sellers was fundamental to the effective use of productive resources and to the maximum satisfaction of human wants. All regulation of production and distribution was, therefore, opposed by liberals on the ground that it denied the consumer his basic right to the free and untrammelled choice of goods.

Miss Hoyt is of course not unaware of the frequent folly of consumer choices, but she insists that these mistakes are an indication of the complexity of modern products and of the limitations of free time for choosing, rather than a mark of consumer

stupidity. If one accepts this argument (and it would be difficult to disprove it), it is but a short step to her main contention that the surest way to provide consumers with the things they want, "fully and freely and at the lowest cost," is to have "an intelligent government" provide means "not for interfering with free private enterprise but for helping it out." This in itself is not a new idea. But her case for less planning and for more competition is presented with an effectiveness that merits attention.

Of the numerous ways she thinks an intelligent government might help producers serve consumers, several have already been advocated by others. Thus it is suggested that federal, state, and local governments should put an end to the traditional political practice of serving special groups at the consumers' expense. According to Miss Hoyt, this could be done by abolishing such agencies as the A.A.A.; by repealing fair-trade and price-maintenance laws; and by abandoning such discriminatory taxes as those levied on oleomargarine for the benefit of butter manufacturers or those imposed on chain stores at the behest of inefficient retailers. A more honest and intelligent regulation of public utility monopolies is also proposed as a means of procuring better, cheaper, and more courteous service for consumers. Some restraint on the excessive demands of organized labor is recommended for similar reasons.

In the field of international competition Miss Hoyt finds high protective tariffs the chief obstacle to the efficient service of consumers. If Congress reduced or entirely abolished such subsidies, the consumer would, she believes, be able to buy appreciably better products at much lower prices. In support of this contention there is offered a convincing if brief analysis of the adverse effect of the Smoot-Hawley tariff on domestic consumption. And, to the argument that protective tariffs preserve the American standard of living, she raises very sound but frequently overlooked objections. She holds that there is little, if any, evidence that tariffs raise the wage level, and shows that any net wage increases due to tariffs could come only at the expense of the consuming public.

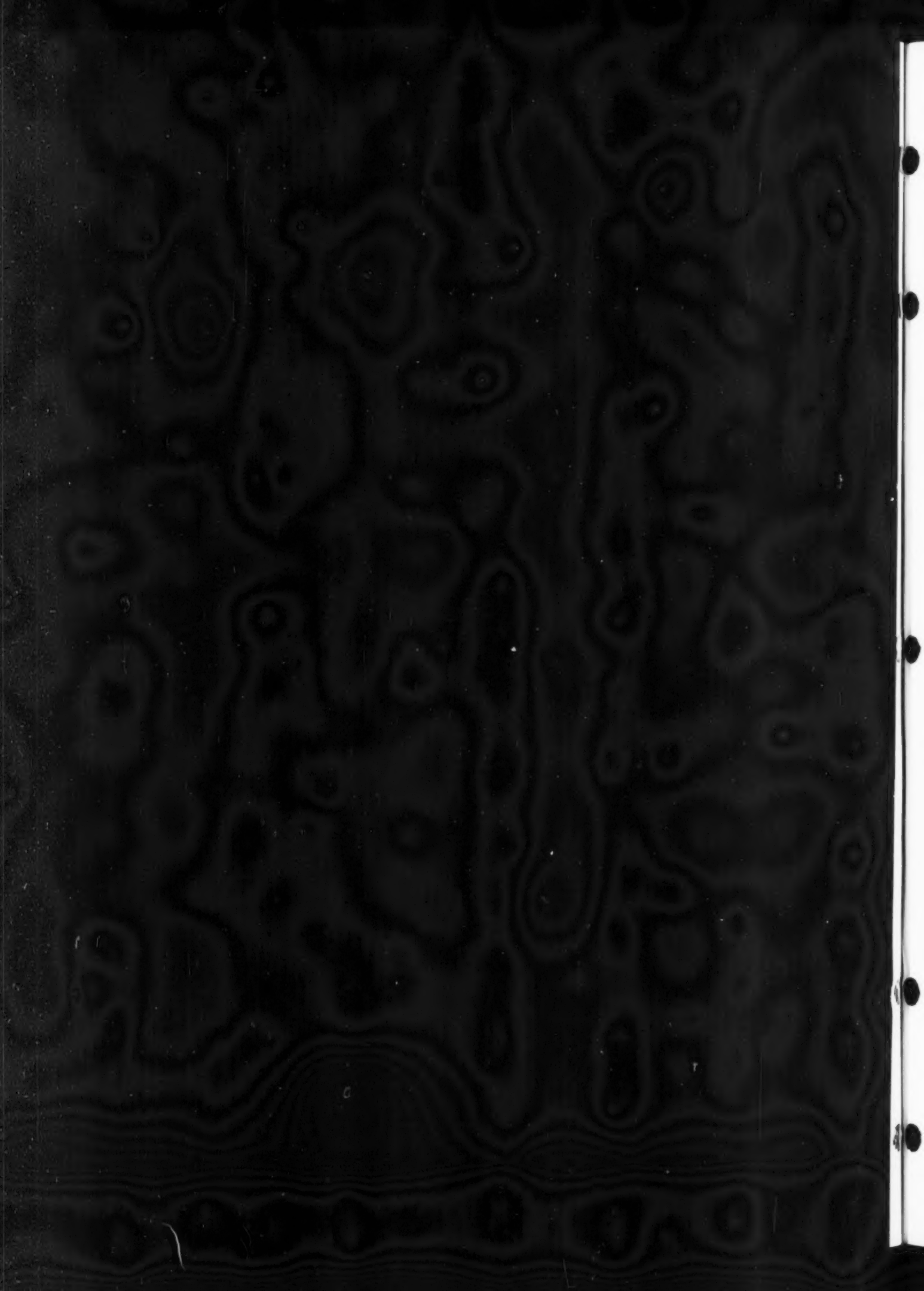
In addition to abolishing special privileges through which particular groups are favored, an intelligent government could, according to Miss Hoyt, also help consumers by protecting them from dangerous products. This could be done, she believes, by enacting really adequate pure food and drug legislation. She also thinks producers could more effectively serve consumers if adequate quality standards and grade-labeling were established and enforced by law. And if fair-trade laws were designed to preserve competition rather than to protect the inefficient, the honest producer would, in her opinion, have an additional incentive to service.

Finally, an intelligent government could help competing producers serve consumers if it were to conduct an educational program aimed at improvement of the standard of living. Such a program would emphasize those potentialities for satisfaction which are at present neglected by "our dominating complex of machine industry." Liberal or cultural subjects, such as art, literature, or music, would be given as much attention as the so-called practical subjects. However, lest such public education become an agency of government propaganda, Miss Hoyt suggests that the healthy competition of independent private education be retained. At the same time she offers a timely word of warning against the uncritical acceptance of what now goes by the name of governmental education on such matters as one's diet. It is as gratifying as it is remarkable to hear a responsible academician say in print that "in the interests of agricultural production, persons concerned with agriculture in this and other countries tend to exaggerate values of some foods." It is equally surprising to find a consumption expert questioning the doctrine widely promulgated in governmental and academic quarters that oranges, lettuce, butter, and milk are dietary essentials. But Miss Hoyt does just that and in the process lays down an effective basis for offsetting some of the propaganda that now gets about under the guise of scientific nutrition.

But this in itself is a minor point. The significant thing is that this book offers a program whereby government might help both producer and consumer without dominating the activities of either. The cynical may stress the practical obstacles that must be overcome before Miss Hoyt's program can be realized. No attempt has been made to minimize these difficulties. But the fact yet remains that her book does outline an interesting alternative to governmental planning which is far less fantastic than most of the experiments currently in vogue. For as she wisely concludes, "An economy planned for consumers must not plan too much, or rather, we may say by a paradox, it must plan to avoid too much planning. . . . The reason for this is our ignorance of what is really best . . . . There are too many things we do not know. Governments have gone on the rocks more often by doing the wrong thing than by doing nothing; and, since consumers' problems are the most subtle ones of all, they are the ones in which the government is most likely to make mistakes."

Miss Hoyt has written a readable book which, whether you agree with her ideas or not, is well worth reading. Those interested in economic questions will find her alternatives to many of the concepts lately fashionable among academic economists both interesting and stimulating to thought.

CHARLES S. WYAND



CUMULATIVE INDEX
General Bulletin, Volume 8: October 1938 to June 1939, Inclusive

This index is for the issues of October 1938, Vol. 8, No. 1; January 1939, Vol. 8, No. 2; April 1939, Vol. 8, No. 3; and June 1939, Vol. 8, No. 4. Single *Bulletins* are 30 cents each. Subscription is $1 for the subscription year (four issues), October through June.

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PREVIOUSLY ISSUED

For the benefit of new subscribers, the contents of CR *Bulletins* previously issued during the current volume year are briefly listed. Issues which are marked "Not Confidential" may be purchased by those who are not subscribers. All *Bulletins* are 30c the copy.

NOVEMBER 1938

"Christmas Cards"—directions for making photographic Christmas cards or having them made.
"Enlargers"—ratings of 15 makes of photographic enlargers.
"Mouthwashes and Antiseptics"
"Electric Lamp Bulbs"—ratings of 11 bulbs
"Phonographs Again?"—general discussion and listings of 3 record-playing attachments and 2 record-playing accessories.
"Fruit Growers Win, Consumers Lose"—discussion of the increase in the tolerance limit for lead on fruit.
"Home Building"—first in a series of discussions on problems facing the consumer who plans to build a house. Deals with selection of materials: wood and logs.

DECEMBER 1938

"Christmas Tree Lights"—ratings of 13 sets.
"Chocolates"—ratings of 8 brands.
"Men's Socks"—ratings of 10 brands.
"Cameras"—new listings of 10 miniature, 5 small, and 2 single-lens reflex cameras.
"A Critical Estimate of Three Modern Pianos"
"Leather Billfolds"—ratings of 11 makes.
"Buy the Right Toys This Christmas"
"Table-Model Radios"—ratings of 24 sets.
"Electric Food Mixers"—ratings of 9 makes.
"Home Workshop Equipment"
"Local-Station High-Fidelity Receivers"—ratings of 3 sets.

FEBRUARY 1939

"Automobiles of 1939"—ratings of 51 cars.
"Winter Gasolines"—ratings of over 50 gasolines.
"Automobile Oils, Winter Grades"—ratings of 36 brands.
"Washing Machines"—ratings of 7 machines.

MARCH 1939

"Automobile Polishes and Waxes"—formula for making wax and ratings of 22 polishes, 8 pre-wax cleaners, and 8 waxes.
"Sewing Machines"—discussion of what to look for and ratings of some 30 machines.
"Photographic Developers"—ratings of 10 brands; and 1 combination developing and fixing solution.
"Automobile Tires"—8 brands listed.
"Recorded Music"—what kind of records to buy, where to buy them, care of records, and recommended album sets.
"Home Building, III: Metals, Foundations, Frames"

MAY 1939

"Tennis Rackets and Racket Strings"—ratings of 10 rackets.
"Bath Towels"—ratings of 10 brands.
"More Tools for the Home Work Shop"
"Bicycles"—report on 8 cycles and 7 brands of tires.
"Used Cars"—a list of defects in earlier models of various automobiles.
"Low-Cost Amplifier for High-Fidelity Use"—report on 1 make.
"More Cameras Tested"—listings of 7 miniature and 2 twin lens reflex cameras.
"Home Building, V: Wall Coverings and Insulation"

OCTOBER 1938 (*Not Confidential*)

"Owning *vs.* Renting an Automobile"
"Toothbrushes"—ratings of 17 brands.
"Household Glues, Cements, and Liquid Solders"
"Automobile Storage Batteries"—ratings of 7 brands.
"Telephone Sets"—ratings of 6 low-priced models.
"Shoe Laces"—ratings of 18 brands or types.
"Exterior Paints: Paste and Semi-Prepared"—ratings of 5 brands.
"Men's and Women's Leather Shoes"—general discussion of construction and care; ratings of 14 makes of women's shoes and 14 makes of men's shoes.
"Arsenic Spray Residues"

JANUARY 1939 (*Not Confidential*)

"An Engineer Looks at 1939 Automobiles"—general discussion of new features seen at the auto show.
"Scale-Model Railroads"
"Muslin Sheets and Pillowcases"—ratings of 10 brands.
'Photographic Enlarger"—discussion of 1 brand.
"Comparative Costs of Developing Photographic Films"
"A Further Report on Gas Ranges"—ratings of 2 brands.
"Men's Shirts"—ratings of 17 brands.
"Inner-Tube Repair Kits"—ratings of 15 brands.
"Photographic Accessories: The Photoflash Synchronizer"—ratings of 10 makes or types.
"Home Building, II: Concrete and Masonry"

APRIL 1939 (*Not Confidential*)

"Radios: 1939 Models," ratings of 9 console sets.
"Razor Blades"—report of test of more than 30 brands.
"Plated Silverware"—results of CR's test of 9 patterns of teaspoons of well-known makes.
'Roller Skates"—ratings of 8 brands.
"Home Workshop Tools"
"Home Building, IV: Roof Coverings"
"Important New Health Hazard for School Children"—results of CR's tests for lead in two brands of yellow chalk.

CR's CUMULATIVE INDEX

Information appearing in CR's *Bulletins* September 1935 through September 1938 has been carefully indexed. This Index is now available. . . . 24 pages, 10c

CONSUMERS' TEST MANUAL 38 pages (including Index) 50c

For teachers of college and high school science classes who are interested in orienting their courses around consumers' problems, this Manual provides some seventy-five tests. Directions are set down in detail and lists of apparatus needed are provided. Included are tests To Distinguish Fresh Butter from Renovated Butter and Oleomargarine, for Gelatin in Ice Cream, for Starch in Face Powder, for Lead in Paint, etc.

EAT, DRINK AND BE WARY by F. J. Schlink

This book discusses the factory-originated trend, now well-nigh universal, toward refined, demineralized, and devitaminized foods. This trend has been followed by futile attempts to restore the old balance of nutritive elements that characterizes natural, unadulterated, honestly prepared foods, by putting over excessive roughage, vitamin D bread, canned orange juice, cod-liver oil, raw vegetables, and other diet quackeries. Diet fads indulged in by the poor and ignorant, and by the well-to-do and educated classes alike, are discussed. The wide propagandizing of milk as a "health food" is shown to be a triumph of big business enterprise and subsidized science rather than a genuine discovery of unbiased, disinterested nutritional scientists.

A constructive summing-up is given of what really *is* known about food science, by experts who aren't hired to have particular views in favor of bran or oranges or viosterol or irradiated milk. The author shows how and what to eat in order to avoid, as well as one can, adulterated, overrefined, and downright dangerous foods and beverages.

Special CR Edition $1

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This book should be read by everyone who is interested in social problems or who wishes to understand clearly various social and economic conflicts which occur daily. Who are Consumers? Are the interests of workers and consumers identical? Would the "workers' state," which is the Utopia of some of our social theorists, concern itself with abolishing patent medicines, chemicalized bread, and other mass-production food?

These questions and many others dealing with the relationship of consumers to other groups are thoughtfully discussed. It is very important to be able to differentiate clearly the concerns of people as consumers from their other roles in society as producers and workers. Teachers of courses in Consumers' Problems will find this book invaluable in orienting their courses and integrating the different parts of their program.

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June, 1939

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ELECTRIC ROASTERS

THOUGH it is CR's opinion that the electric roaster is a versatile and useful appliance, we think consumers may need to be cautioned that they should not be misled by clever advertising or demonstrations into a belief that the roaster provides a general and permanent substitute for a good stove. It has useful functions in baking, cooking, and roasting vegetables, but don't expect it to provide a convenient means for frying the breakfast bacon and eggs or boiling a quick-cooking cereal, unless it is equipped with one of the broiler-fryer types of attachments available at extra cost with some roasters. If both meat and vegetables are to be cooked at the same time, some models of roasters with small roasting pans limit one's choice (a medium-sized leg of lamb would be difficult to squeeze in but a small chicken would fit).

The electric roaster has its uses as a convenient auxiliary to a two-burner gas or electric plate, or to an oil stove that lacks an oven, and, in a sense, to any stove that does not have a thermostatically controlled oven. For the apartment dweller who cooks small portions and does not mind the limitations of choice which the roaster imposes for a given meal, a well-chosen roaster might be a good appliance—certainly a convenient one. In combination with a two-burner hot plate and necessary working space, it would at least be very economical in original cost as a substitute for a full-sized electric or gas stove, but there is no certainty that it would offer an advantage when it comes to space saving.

Eight portable roasters of the conventional type and one portable oven were included in the test just completed by CR. All were designed for use on a-c only. The *Universal* portable oven was judged to be of sufficient size to cook a good-sized roast, two vegetables, and potatoes for a family of four or five. The conventional-type roasters varied in size from the small *Norge* and *Miracle*, in which meals for not more than three or four people could be cooked, to the large *Heatmaster*, in which a dinner consisting of meat, potatoes, and two vegetables for possibly as many as eight persons could easily be prepared. Each of the roasters was equipped with a large removable porcelain enamel inset pan which could be used for large roasts, pot-roast with vegetables, soup or stew, etc., and either three or four small utensils, shaped to fit the available space in the roaster, which could be used for cooking meat, vegetables, and potatoes, all at the same time, within the limitations already mentioned. The portable oven came equipped with a small roasting pan, a cooky sheet, and two fairly good sized vegetable pans. The fact that there was no single large utensil designed for most efficient utilization of the oven space limits, to some degree, the possibilities of the oven's usefulness, and makes the cooking of soup, stew, and pot-roasts, etc., more difficult to do than in the inset pans of the conventional-type roasters. For this reason the conventional-type roasters would seem to be somewhat superior to the small electric oven for practical everyday use, particularly if they are equipped with a good broiler unit.

In the portable oven, provision was made for transferring the heating unit from the bottom to the top of the cooking space so that it could be used for broiling. None of the conventional-type roasters was equipped for broiling but several of them had provisions for attaching a broiling unit if desired. Prices for these vary—the simple broiler unit for the *Heatmaster* is about $2.50, and the more elaborate *Naxon Autochef* "broiler-range" unit, which has two cooking elements installed in such a manner that they may be converted into a broiler, is $7.50. CR did not purchase or study the broiler units, and did not make tests for electrical safety of the appliances with the broiler units installed.

Tests made on the roasters and oven included a careful mechanical examination which gave consideration to such matters as type and durability of finish, food-holding capacity of the various utensils with which the appliances were equipped, the material of which the utensils were made, and other important items. The electrical tests for safety of insulation included insulation resistance measurements by standard methods under three conditions—initially, as received; hot, after continuous operation for one hour at highest heat; and again, after cooling for 48 hours. Each appliance was subjected to a thousand-volt flashover test as received and after continuous operation for 1 hour at highest heat. Power consumption of the roasters was measured. Extent of radio interference was noted and was found to be, in most cases, no more than a momentary click when the current came on in each roaster. Thermal efficiency of the roasters, or effectiveness of the heat insulation, was checked by setting the thermostats at 450°F and allowing the roasters to run for 48 hours. The energy consumed during that time was measured and the kilowatt-hour consumption per hour per quart of roaster capacity was computed. A larger roaster will naturally be more expensive to heat than a smaller one but may be just as efficient per unit

of capacity; it was felt that the electrical energy consumption per quart figure gave a fair basis of comparison. The effectiveness of the thermostats was measured at four different settings and at three places (both ends and the middle) in each roaster. The average deviation of the actual temperature at 400°F from the nominal was found to vary in the middle of the roasters from −8°F in a roaster with a good regulator to about 76°F in one with a poor regulator. Temperatures were taken of the cover and carrying handles and of the top cover and side of each roaster, and due notation made when these were too high (above 150°F). The temperature under each roaster was taken after it had been in continuous operation for 3 hours at the maximum regulator setting in order to determine whether or not the table on which it would rest would need to be protected from the heat. Practical use tests were made on all the roasters except the *Naxon* and *Miracle*, which were received for test so late that this was not possible.

All the roasters with the exception of the *Miracle* were finished outside with a baked enamel. The *Miracle* had a lacquer finish. Instruction books were furnished with all the roasters except the *Miracle*. With the exception of the portable oven, efficiency rankings are based on electrical energy consumption per hour per quart of roaster food-holding capacity. None of the enamelware equipment of the roasters was tested for possible contamination with heavy metals. (For further information on this and on aluminum cooking utensils, see section on *Kitchen and Dining-Room Ware* in CR's September 1938 *Annual Cumulative Bulletin*, cols, 371-378.) Radio interference was slight unless otherwise noted.

Ratings are cr 39.

Conventional-type Roasters

A. Recommended

Heatmaster, De Luxe Automatic, Cat. No. 20—2080 (Proctor Electric Company, Philadelphia; distrib. Sears, Roebuck & Co.) $16.95 plus transportation. Large roaster of rectangular shape, with 4 good-sized aluminum utensils. Best planned of the group tested for utilization of interior space. Efficiency in use of electricity much better than average. As received, failed insulation tests by a very small margin (this condition corrected itself during the course of other tests). Finish judged not quite as good as that of *Montgomery Ward*. Accuracy of thermostat control about average.* **1**

Montgomery Ward, Automatic, Cat. No. 86—4993 (Distrib. Montgomery Ward & Co.) $16.95 (similar model in sale catalog, $15.95) plus transportation. Large roaster of rectangular shape, with 3 good-sized aluminum utensils. Operating efficiency much better than average. Satisfactory performance in all tests, except that as received, it failed insulation tests by a very small margin (the condition corrected itself during the course of other tests). Thermostat control very good. This number is not listed in Wards 1939 spring and summer catalog, but No. 486—4998 is claimed by the distributor to be the same roaster except that it has *Glasbake* dishes.† **1**

B. Intermediate

General Electric Hotpoint, Model 123 C 13 (General Electric Co., Bridgeport, Conn.) $26.90. Very similar in appearance to *Montgomery Ward* except that pans were heavy cream-colored enamelware. Operating efficiency much better than average, and performed better than the *Ward* appliance except that thermostatic control was not as good and roaster failed on the 1000-volt flashover test when hot. This failure was caused by the pilot-light wire touching the pilot-light housing, a fault which could easily have been corrected at time of manufacture by bending the wire. Except for this fault roaster would warrant an *A* rating.*† **3**

Westinghouse Automeal, Model RRA—34A (Westinghouse Electric & Manufacturing Co., Mansfield, Ohio) $29.95. Large roaster of rectangular shape, with 3 good-sized *Glasbake* dishes. Operating efficiency somewhat better than average. Performed well in most tests but thermostat control was very poor.* **3**

C. Not Recommended

Nesco, Model RA 96. $19.95. Small, oval shape, with 1 large and 2 small brown enamelware pans. Operating efficiency below average. Failed in both insulation resistance and flashover tests. Apparently no provision for broiler attachment.* **1**

Miracle, Model 1. $21.50. Small, oval shape, with 3 rather small aluminum pans. Operating efficiency much below average; finish and quality of equipment judged lowest. Thermostat control poor.*† **2**

Naxon Autochef, Model 1036. $24.95. Medium-sized, oval, with 1 large and 2 small brown enamelware pans. Operating efficiency much below average. Heat leakage, due to poor insulation, so great that maximum temperature indicated on regulator dial could not be attained. Failed in both flashover and insulation resistance tests.*† **2**

Norge, No. A1-671. $21.95. Smallest of roasters tested. Oval shape, with 1 large and 2 small aluminum utensils. Operating efficiency much below average. Failed in insulation resistance test by considerable margin. Thermostatic control poor. Radio interference moderately bad. Apparently no provision for broiler attachment. **2**

Portable Oven-type Roaster

A. Recommended

Universal, No. E 991 (Landers, Frary & Clark, New Britain, Conn.) $29.95. Rectangular oven of approximately 15½ x 9 x 9 in. usable space. Chromium-trimmed white porcelain; shallow roasting pan, 2 fairly good-sized vegetable pans, and a small cooky sheet. Efficient in use of electricity and performed well in all tests. (But see text for possible limitations in usefulness of this type of appliance.) Radio interference moderately bad. **3**

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* Supporting surface should be protected by asbestos or other heat-resistant pad.

† Cover handle temperature was greater than 150°F after roaster had been continuously operated for approximately three hours at highest temperature.

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ELECTRIC RANGES

HOUSEWIVES who have had experience with good electric ranges quite generally assert that electricity provides one of the most satisfactory ways for cooking yet developed; they will agree, however, that even the best ranges are still somewhat short of perfection. A good electric oven does a particularly fine job of roasting meats and of baking bread and cake. The electric range is convenient and cool to operate and if properly installed, is, moreover, a relatively safe appliance for a family with children. With gas and bottled gas ranges, there is often a very real danger that youngsters will turn on the gas cocks—a simple but vital matter to which range manufacturers have given far too little study. Also with the gas range there is necessarily considerable hazard of asphyxiation, or of fire and explosion (the latter two particularly with bottled gas).

Cost of Electric Cooking

The principal fault of the electric range is its high costs—high initial cost, high repair cost, and high energy cost. Not only is the initial cost of the stove high, and, in our opinion, high out of proportion to any reasonable costs in mass production, but installation of the necessary heavy wiring from the public utility's power line to the stove may increase this by an amount varying from $15 to $85. Heating units occasionally burn out and have to be replaced or repaired, and switches sometimes go bad. The amount of electricity used per month depends upon how well the stove is made, and how much it is used. By using pans which have really flat bottoms that cover the entire heating units, by turning the units always to the lowest heat that will give satisfactory cooking, by cooking with as little water as practicable, and by using the oven to cook several things whenever the oven is heated, it is possible for the housewife to effect appreciable savings in consumption of electricity.

For purposes of an approximate estimate of the cost of electric cooking, it may be assumed that 150 kilowatt-hours per month will be required by a family of five. With only two in the family 100 kilowatt-hours may suffice; with seven or eight in the family perhaps 200 kilowatt-hours.

Heating Units

There was a time when only the open coil surface heating unit and a similar unit covered with a metal disk were available. These units, while they have the advantage of being relatively easy to repair when the heating wire burns out, heat up slowly and cost a good deal to operate except where electric rates are unusually low. Other heating coils in recent years have been developed which are much faster and cost less to use. Of these newer units, Consumers' Research has found that *Calrod* and *T-K* units, both of which have the heating wires embedded inside a coiled metal tube, and the *Chromalox* unit, in which the heating wires are embedded in annular flat-surfaced metal rings, have relatively high efficiencies. "Cooking-efficiencies" of these units in 1200- or 1300-watt sizes lay within the rather narrow limits of 65 and 69 percent. On the other hand, the *Corox* unit, in which the metal tubes are embedded in a metal disk, was found to have an efficiency of only 55 percent. The *Calrod* unit is available on *Hotpoint* ranges, the *T-K* unit is furnished on *L & H* ranges (and other ranges not tested), and the *Chromalox* unit is supplied on *Electroday*, *Frigidaire*, and others.

With a stove, it is particularly important to consider efficiency in the use of electricity because, at best, its energy consumption is high. Anyone disregarding efficiency will find that his bills for electricity wasted every month will add up to a rather large sum in the course of a few years.

The number of surface heating units, their size, size of the oven, and automatic features which are desirable depend upon individual family needs. One deep-well type cooking unit, which is economical for long-time cooking processes, e.g., for stews and pot roasts, one large 2000- or 2200-watt unit for large pans and dishes, and two 1200- or 1300-watt units will be a desirable selection of surface units for a medium-sized family. Many surface units provide three degrees of heat—high, medium, and low. Recently units have been offered which provide five degrees of heat, the two lowest serving to simmer or to keep foods warm. This type is desirable especially for the convenience and economy it affords in long-time slow-cooking processes. One important point on which manufacturers of electric ranges could easily show more consideration than is customary is the matter of marking the switches to show what degree of heat has been turned on. Switches should be clearly enough marked so that even a stranger to the stove would have no difficulty in operating it, and especially in being sure whether it was turned on, or completely off.

As mentioned in CR's previous report in December 1934, electric ranges used abroad are often designed in such a way as to draw a small amount of electric current continuously and to store the heat generated until it is wanted for use. Although this type of range has the important advantages of being ready for use instantly at any time and of

not requiring installation of extra heavy wiring, no manufacturer to date has seen fit to make it available to the American public.

Description of Ranges Tested

The ranges tested by Consumers' Research all had flat tops. *Hotpoint Canterbury* and *L & H Norwood* had divided tops, i.e., the work surface was in the middle of the top and two heating units were to the right and two to the left of this. Each range, with the exception of *Hotpoint Canterbury* and *Electroday*, was provided with one storage drawer or compartment; the *Hotpoint Canterbury* did not have any, and the *Electroday* had two drawers and one warming cabinet. The ranges tested had one well-type cooker and three surface units of which one was a large size (2000, 2100, or 2200 watts). In both *Electroday* and *Frigidaire* ranges the heating element in the well-type cooker was of the same type as used for the surface units; in the other ranges tested the heating element in the cooker was of the open coil type and was different from the surface heating units. All oven doors opened downward and could serve as a shelf when open. Three of the ranges, *L & H Norwood*, *Electroday*, and *Westinghouse Conqueror*, had two heating elements in the oven, the top one being the broiler. The other ranges had only one oven heating element; this was raised three or four inches above the bottom of the oven, however, so that it could be used for broiling. Except for the *Electroday*, the ranges tested were not equipped with timers for automatically turning on the electricity at some predetermined time, but most of the ranges had connections for them in case the purchaser should wish to have one installed either at the time of purchase or later. *Electroday* and *L & H Norwood* were the only ones of the ranges tested which rested on a base. The others had legs from 12 to 17 inches high. All ranges were provided with one electrical outlet for attachment of electric appliances, such as a toaster or flatiron. In the case of *Frigidaire* and *Westinghouse Conqueror* these outlets were located at the front of the range (judged preferable to a location in the rear splasher panel back of the surface heating units). Cooking utensils furnished to fit the well-type cookers were made of aluminum.

CR's Tests

In CR's tests, efficiencies of one large-sized unit and of one small-sized unit of each range were measured by a test procedure in which water in aluminum vessels was brought to a boil from a temperature of 60°F. Power consumption was determined for all heating units and compared with the ratings given by the manufacturer. The time and energy consumption required to preheat the oven of each range were also determined and the effectiveness of the oven insulation was measured. Oven thermostats were tested for accuracy. All ranges were given a careful engineering examination and were also given the usual tests to ascertain safety of electrical insulation. Efficiencies of 1200- and 1300-watt surface units of the ranges tested varied over the wide range of 55 to 69 percent. Efficiencies of the 2000-, 2100-, and 2200-watt units varied from 46 to 57 percent. Time required to preheat the ovens to a temperature of 400°F varied from 6.3 minutes to 10.8 minutes for the different ranges; the cost to preheat, at 3 cents per kilowatt-hour, varied from 1.16 to 1.46 cents. None of the ranges fully met standard requirements for safety of electrical insulation. For this reason it is judged particularly important, in order to assure safety with electric ranges, to have a sure, permanent ground connection made at the time of installation. Surface units were satisfactorily level unless otherwise noted. The following ratings are based upon the results of the tests just described.

Ratings are cr 39.

B. Intermediate

Electroday, No. 30930 (Distrib. Sears, Roebuck & Co. retail stores) $139.95 including automatic oven timer. *Chromalox* five-heat surface units. Efficiency of small surface unit, 69%; of large surface unit, 54%. Time to preheat oven to 400°F, 6.3 minutes; cost, at 3c per kilowatt-hour, 1.4c. Thermostat operating period unduly long, permitting large variations of temperature in oven. At a setting of 500°F temperature fluctuated from 456°F to 524°F; at a setting of 300°F temperature fluctuated from 253°F to 345°F. Low-priced and judged exceptional value in comparison with other ranges on market having similar equipment. Effectiveness of oven insulation better than average. Usable baking space: height 10½ in., width 16¼ in., depth 17½ in.; one of the largest ovens in ranges tested.

Electromaster, Model No. 177 (Electromaster Inc., Detroit) $114.50. *Chromalox* three-heat surface units. Efficiency of small surface unit, 68%; of large surface unit, 56%. Time to preheat oven to 400°F, 7.7 minutes, cost, at 3c per kilowatt-hour, 1.1c. Thermostat somewhat inaccurate. At a setting of 500°F, temperature fluctuated from 490°F to 548°F; at a setting of 300°F, temperature fluctuated from 291°F to 361°F. Effectiveness of oven insulation poorer than average. Stove lacked connections for conveniently connecting automatic timer. Manufacturer failed to provide wiring diagram (which is important when trouble develops or repairs have to be made). Usable baking space: height 8½ in., width 15½ in., depth 17 in.; smallest oven in ranges tested.

Frigidaire, Model L-10-39 (Frigidaire Div., General Motors Corp., Dayton, Ohio) $119.50. *Chromalox* five-heat surface units. Efficiency of small surface unit, 65%; of large surface unit, 54%. Time to preheat oven to 400°F, 10.8 minutes; cost, at 3c per kilowatt-hour, 1.5c. Functioning of thermostat satisfactory. Effectiveness of oven insulation better than average. Stove

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B. Intermediate (contd.)

lacked connections for conveniently connecting automatic timer. Usable baking space: height 11½ in., width 14½ in., depth 18¼ in.; one of the largest ovens in ranges tested.

Hotpoint Canterbury, Model No. 109RB2 (Edison General Electric Appliance Co., Inc., 5600 W. Taylor St., Chicago) $123.50. *Calrod* surface units; all were three-heat units although catalog listed one five-heat unit as standard equipment. Efficiency of small surface unit, 66%; of large surface unit, 55%. Surface units reasonably level although they were less satisfactory in this respect than those of other ranges tested. Time to preheat oven to 400°F, 8 minutes; cost, at 3c per kilowatt-hour, 1.2c. Functioning of thermostat satisfactory. Effectiveness of oven insulation better than average. Oven heating unit initially supplied had incorrect voltage rating and had to be returned for replacement. Fit of oven door judged not fully satisfactory. Only range tested which lacked oven door stop for holding door partly open during broiling. Switches not marked to indicate "on" and "off" and degree of heat. Usable baking space (above broiler): height 10¼ in., width 14¾ in., depth 17¾ in.

B. Intermediate (contd.)

L. & H The Norwood, Model 8704B (A. J. Lindemann & Hoverson Co., Milwaukee) $134.50. *T-K* (Tuttle & Kift) five-heat surface units. Efficiency of small surface unit, 66%; of large surface unit, 57%. Time to preheat oven to 400°F, 7.3 minutes; cost, at 3c per kilowatt-hour, 1.2c. Functioning of thermostat satisfactory. Effectiveness of oven insulation poorer than average. Fuse protecting "convenience outlet" was in an inconvenient position. Wiring was judged to be poorly arranged. No permanent marking of switches to indicate which heating elements they controlled. Usable baking space: height 9¼ in., width 14½ in., depth 17½ in.

C. Not Recommended

Westinghouse Conqueror, Model No. TH-64 (Westinghouse Electric & Mfg. Co., Mansfield, Ohio) $116.50. *Corox* three-heat surface units. Efficiency of small surface unit, only 55%; of large surface unit, only 46%. Time to preheat oven to 400°F, 7.1 minutes; cost, at 3c per kilowatt-hour, 1.4c. Functioning of thermostat satisfactory. Effectiveness of oven insulation poorer than average. Switches not marked to indicate "on" and "off" and degree of heat. Usable baking space: height 9¾ in., width 14½ in., depth 18½ in.

THE NEW PORTABLE RADIOS

THE problems of battery-operated portable radios make a long story, but in this, our last *Bulletin* before the summer vacation, we can only find room for that minimum of information which will help you to understand the problem and explain what you are up against. The background of reasons and of sales tactics involved will have to await a longer story early next spring (if the vogue for portable radios continues). When considering a portable radio, the following points should be kept in mind: (1) *quality of reproduction will be poor*—unavoidably, in all cases; (2) cost of operation will be high—$1 to $1.50 a month, or thereabouts, for batteries when the set is in moderate use, and three times that much, or more, if the set is used many hours a day, as by children or campers, or if poor or depreciated batteries happen to be purchased (*Eveready* and *Burgess* are recommended for the present)—keep batteries, in or out of set, at all times in coolest possible place; (3) portable sets will not work well in automobiles or as a substitute for an automobile radio; (4) reception is likely to be very unsatisfactory with the best of the portables (especially without external antenna), at distances greater than 50 to 75 miles from powerful transmitting stations; if set is to be used in the wilds, remote from broadcasting stations, be sure to buy one which provides for connection of an external antenna; (5) portables are not good enough to be considered for a permanent home or office installation.

Since the "B" batteries used in these sets are likely to function longer than the "A" batteries, it may in some cases be possible to restore service by replacing only the "A" battery instead of a complete new set. This practice when feasible will, of course, cut cost of operation, and will not harm the set in any way.

Prices include batteries (one 1½-v "A" and two 45-v "B" batteries). The three sets reported used superheterodyne circuit, had self-contained loop antennas, and were cased in fabric-covered wood.

Ratings are cr 39.

B. Intermediate

Emerson, Model CE-263 (Emerson Radio & Phonograph Corp., 111 Eighth Ave., N.Y.C.) $24.95. 5 tubes. Sensitivity somewhat better than that of other sets tested, perhaps due to additional tube. Tone quality, wiring, and cabinet construction fair, for this type of set. This set had somewhat greater filament current consumption, necessitating more frequent replacement of "A" batteries than the *Pilot*; its "B"-battery drain was about the same. **2**

Pilot, Model TH-11 (Pilot Radio Corp., Long Island City, N.Y.) $29.95. 4 tubes. Sensitivity lower than *Emerson* and about equal to *RCA*. Tone quality about like *Emerson*. Disposition of batteries caused poor distribution of weight, making set somewhat awkward to carry. **2**

C. Not Recommended

RCA, Model 94BP1 (RCA Mfg. Co., Camden, N.J.) $19.95. 4 tubes. In tone quality and in some other respects considered definitely less satisfactory than *Pilot* or *Emerson*. Had no provision for connection of external antenna (see text). **1**

SUMMER GASOLINES

THE Ethyl Gasoline Corporation, sole manufacturer of antiknock fluids containing tetraethyl lead, recently bought space in a trade magazine to make the following appeal to garagemen. (Naturally, it differs considerably from the type of advertising used in magazines sold to the public, because it is written to help the gasoline dealer sell to his customers a product which 90 percent of them do not need and in the opinion of many should not use.)

What to say
when customers say:
"I CAN'T SEE
ANY DIFFERENCE!"

You want Mr. Jones to buy a good grade of gasoline from you. But suppose Mr. Jones suddenly gets the idea he can "economize"...starts buying low-grade gasoline and tells you that he "can't see any difference in performance!"

What's the answer? Just this: Mr. Jones' car needs *tuning-up*...and by that we mean it should be tuned-*up* by a competent tune-up man to take advantage of the better grades of gasoline you want him to use. Very often cars are tuned-*down*—by retarding the spark—to permit the use of low-grade gasoline without "knock" or "ping."

Remember, modern high compression cars are built to deliver top power and economy only when the spark is *advanced* to the point of "maximum performance." A *retarded* spark means *loss* of power and economy.

Because there are different grades of gasoline sold today, every car has different grades of performance, depending on the gas used and the spark setting.

* * *

Consumers will note how different is the advertising appeal in trade journals as compared with that in magazines read by the public. ¶Any urging by a motor car salesman that a car, truck, or tractor should be run on premium fuel should be considered as an admission of faulty engine design. No consumer should believe statements, however persuasively presented, to the effect that although premium fuel costs more, it gives additional mileage or other virtues sufficient to compensate, or more than compensate, for the extra 3 cents a gallon cost. It is true that if low-octane non-premium fuel is used, the spark may have to be set back to reduce the knock, and power and mileage are thereby reduced somewhat. Nevertheless, the slight reduction in mileage per gallon is definitely less costly than the excess paid for the higher-priced fuel. In the old days a spark lever was provided at the steering post. Nowadays, perhaps to make the cheaper fuels somewhat less practicable, a spark lever or "octane selector," or something equivalent to it, is provided under the hood so that only an auto mechanic commonly gets at it. [It is well for consumers to remember that on many points at which they have gained in convenience or service, which has enabled them to avoid getting out tools or dirtying their hands, they are paying not only for the cost of the service but may pay a great deal more for some important disadvantage accruing from turning the responsibility over to another person. It goes without saying that whenever it's a question of saving money, it's much more likely to be saved by the consumer, himself, in making an adjustment that affects future fuel consumption than by anyone whom he may employ to do the job]. The lack of economy involved in a serviceman's making an adjustment is perhaps obvious enough, but such a lack is more than ordinarily pronounced perhaps, when the Ethyl Gasoline Corporation, which has a strong interest in selling you their kind of gasolines, gets behind the matter and, in a manner quite unknown to the consumer, gives "advice" on spark-timing adjustment that will result in your car's performing badly on gasolines other than those out of which Ethyl makes its money. In the language of Ethyl's advertising, "a competent tune-up man" means a tune-up man who will make such an adjustment that your car will not run well on non-premium fuel.

* * * *

To obtain best performance on any fuel, the spark should be set so that when the engine has run for a time and is at full operating temperature, not more than a light knock is heard at any speed when accelerating with the accelerator fully depressed. A faint or light knock or tapping sound will not harm an engine.

For economy, as Consumers' Research has repeatedly and carefully explained, the consumer should use relatively low-priced third-structure gasolines of good quality (non-leaded, whenever non-leaded gasolines are still to be had). These will give good performance in practically all cars, with the exception of some of the most recent models of a few makes, provided the spark advance of the car is properly set for the octane number of the gasoline used.

In order that new subscribers may clearly understand the following ratings, the qualities of gasolines which form the basis of the ratings are condensed here from the more detailed discussion given in *A Consumer's Study of Automobile Gasolines and Lubricating Oils—SB 26* (25 cents).

Antiknock Quality. The tendency of a gasoline to produce knock in an engine is expressed by the "octane number." The higher the octane number, the less will be the tendency to knock. In the gasoline tests reported in this *Bulletin*, octane numbers were found ranging from 50 to 73.5. A change of 10 in the octane number will change

the knock from one which is just detectable to a distinct, sharp knock in the average car, whereas a change of 1 in the octane number will alter the knock by an amount which is barely noticeable to the trained expert. The majority of cars can be adjusted to use gasoline having an octane number as low as 60; older cars and trucks may use gasoline having even lower octane numbers without objectionable "pinging." In general, a change of one degree in the angle of the distributor arm or rotor gives a change in knock-correction equivalent to a change of 2 in octane number of gasoline.

Acceleration. Ability of a car to accelerate quickly is especially dependent upon the gasoline used. The gasoline which is most volatile, i.e., which can be vaporized most rapidly in the carburetor, will permit the most rapid acceleration.

Ease of Starting and Tendency to Vapor Lock. Both of these properties also depend on the volatility of the gasoline, in such a manner that the gasoline which starts most readily also tends most readily to cause trouble through occurrence of vapor lock under hot weather or hot-engine conditions. Vapor lock is caused by clogging or blocking of the fuel line with bubbles of gasoline vapor which have emerged from the liquid during its flow to the carburetor. It causes the engine to falter on accelerating, or even, in some cases, to stop completely (and it may make the engine very difficult to restart just after it has stopped; that could mean serious trouble in the case of a stoppage at a critical point on the road, for example, at a trunk-highway crossing or on a railroad track). Vapor-lock trouble is most likely to occur in localities which are subject to extreme changes of temperature. Where the range of atmospheric temperatures is greater in the winter than in summer, more trouble with vapor lock may be experienced in winter, with certain gasolines (because of refiners' practices of varying volatility characteristics of their fuel with the season).

Crankcase Dilution. Crankcase dilution by gasoline depends upon the presence of (kerosene-like) constituents in the gasoline which are difficult to volatilize.

Gum. So-called "gum" in gasoline is a residue left behind when gasoline evaporates; it is manifested as a lacquer-like deposit which sometimes causes valves and piston rings to stick.

Corrosion. The damage to an engine from corrosion caused by gasoline is greatly increased by the presence of appreciable amounts of sulphur. Sulphur content should not exceed a small fraction of one percent.

This report of CR lists 70 samples of gasoline which were rated on the characteristics given in the preceding paragraphs. The various characteristics were satisfactory in each case, except when otherwise noted in the listings. Octane numbers below 60 were judged not fully satisfactory; below 55, unsatisfactory.

The regions where the samples were purchased are indicated in parentheses immediately after the brand names, i.e., (PC), sample bought on the Pacific Coast; (MW), Middle West; (W), West; (S), South; (E), East.

A few subscribers have complained that our reports on gasolines and oils appear too late to be of the greatest service to them. It should be noted, however, that in covering wide sections of the country it is impossible to purchase samples, arrange for their shipment to a central point, make tests, correlate and interpret the results, and issue the reports earlier than in the present *Bulletin*. One reason is that in certain sections of the country the appearance of summer grades on the market lags considerably behind other sections. For example, summer gasolines from Texas have not been included in this report, because, at the time purchases had to be made to finish these tests in time for this *Bulletin*, Texas summer gasolines were not yet on the market (a between-season grade being then stocked, and summer grades not expected until after the lapse of another thirty days). Samples purchased in Kentucky were lost in transit. Unless otherwise noted, gasolines are third structure and non-leaded.

NOTE: The gasolines listed as non-leaded were non-leaded at the time of purchase by CR, but no guaranty can be given that they will remain lead-free, for marketing conditions in the gasoline trade are continually and irrationally changed without notice to consumers. *A* or *B* ratings given do not apply if or when tetraethyl lead is added to any of the following gasolines which were not leaded at the time of test. Ratings are cr 39.

A. Recommended

Amoco Artex (E), 64.
Associated White Gold (PC), 64.
Atlantic Capitol (E), 67.
Blue Sunoco Regular (E), 70. (Note *C* rating of Midwestern sample.)
General Metro (PC), 62.5.
Gilmore Blue Green (PC), 63.
Mohawk Golden Arrow (PC), 66.
Mohawk "75" (PC), 66.
Motor (Cities Service) (E), 63.
Navy Admiral Visalia Regular (PC), 68.
Navy Bakersfield Regular (PC), 71.
Norwalk "70" Regular (PC), 71.
Norwalk Streamline Regular (PC), 73.5.
Petrol "Ping Proof" Regular (PC), 67.5. Contained small (insignificant) proportion of lead.
Richfield Flash (PC), 64. (Note *C* rating of Western sample.)
Rio Grande G Gas (PC), 64.
Shell Green Streak (PC), 64.
Shell Super (E), 69.
Signal Peerless (PC), 63.
Sunland (PC), 64.
Texaco Indian (PC), 64. (Note *B* rating of Western sample.)
Tidex (E), 64.
U. S. Motor Specification (Sinclair) (E), 64.5; (S), 63.
Union White Magic (PC), 64.
Wilshire "Polly" Regular (PC), 72.5.
Wilshire "Super Octane" Regular (PC), 70.

B. Intermediate

Acto (S), 59.
Caminol Beacon-Publix (PC), 60. Tendency to crankcase dilution somewhat greater than average.
Caminol Security Regular Leaded (PC), 72.3
Champion (S), 58.5.

B. Intermediate (contd.)

El Tejon Regular (PC), 70. Below average in acceleration.
General Mobile Regular Leaded (PC), 73.
Gilmore Red Lion Regular Leaded (PC), 72.3.
Hancock Regular (PC), 70. Below average in acceleration.
Magic (W), 63. Tendency to vapor lock greater than average.
Metro Leaded (MW), 68; (W), 65.
Navy Visalia Regular (PC), 68. Below average in acceleration.
Pennant Leaded (W), 65; (MW), 66.
Signal Regular Leaded (PC), 72.
Standard Flight (PC), 60.
Stanolind Leaded (MW), 65.5. (Note C rating of Western sample.)
Sunland "H-O" Regular Leaded (PC), 72.
Texaco Indian (W), 63.
Union "76" Regular Leaded (PC), 72.
Unique Leaded (W), 65.3.

C. Not Recommended

Associated Flying "A" Regular Leaded (PC), 72.5. Tendency to vapor lock greater than average.
Blue Sunoco Regular (MW), 71.5. Tendency to vapor lock very high.
Demand Leaded (W), 64. Tendency to vapor lock greater than average.
Flight (W), 63. Tendency to vapor lock very great.
Green Streak (W), 65. Tendency to vapor lock greater than average.

C. Not Recommended (contd.)

Gulf Traffic (MW), 51.
Hancock "5 Point" Regular Leaded (PC), 71. Corrosion tendency considerable.
Hi-Flash (Coates) (PC), 62. Corrosion tendency very high.
Mohawk "Super" Regular Leaded (PC), 72.3. Corrosion tendency considerable.
Petrol Anti-Knock (PC), 70. Tendency to vapor lock much greater than average.
Purol Pep Leaded (MW), 70. Gum content high.
Richfield Flash (W), 65. Tendency to vapor lock greater than average.
Richfield "Hi-Octane" Regular Leaded (PC), 72.5. Corrosion tendency considerable.
Rio Grande Cracked Regular Leaded (PC), 72.5. Corrosion tendency considerable.
Shell Super Regular Leaded (PC), 70.5. Tendency to vapor lock greater than average.
Silver Shell (MW), 50.
Spur Leaded (S), 71.5. Gum content high.
Standard Unsurpassed Regular Leaded (PC), 70.5. Tendency to vapor lock greater than average.
Stanolind Leaded (W), 65. Tendency to vapor lock greater than average.
Texaco Fire Chief Regular Leaded (PC), 70.5. Tendency to vapor lock greater than average.
Western (El Tejon) (PC), 68. Tendency to vapor lock and corrosion greater than average.
Wilshire Economy (PC), 68.5. Corrosion tendency considerable.

AUTOMOBILE OILS—SUMMER GRADES

MANY subscribers have apparently been puzzled by claims for differences and supposed differences in the quality of motor oil. Many, we find, have not drawn the inference we supposed they readily would draw from our numerous test findings on automobile oils. This has perhaps been natural enough because we have not had space available to draw comparisons in the necessary detail between the advertising claims and the actual performance of the various oils on test. (Sometimes when we have discussed the absurdity of certain advertising claims, a few subscribers have written to say that they already know that the purpose of much advertising is to mislead or confuse, and that CR should assume a knowledge of this characteristic of advertising on the part of its subscribers.) Nevertheless, there are so many letters received from subscribers showing that they do retain a degree of belief in the special claims made for particular brands that we wish to assure our readers that the differences in the practical *merits in use* of competitive oils are (much as with cigarets) in nearly every case unimportant or negligible, and that certainly the differences between high- and low-priced oils which have received equal ratings in CR's *Bulletins* are practically insignificant from the consumer's point of view. Readers may properly assume that claims for special properties in lubricating oils are mainly matters of straining for effect and differentiation in words—in advertising copy. One maker, for example, less modest perhaps than most, claims "Greater Speed....Quicker Acceleration....Greater Hill-Climbing Ability....Reduces Motor Wear." Another claims that his product is a "special oil for stop-and-go driving" and that it "flows instantly to every moving part, even on cold starts." Other claims are: "Will DOUBLE and TREBLE the useful life of any oil or grease," "Guaranteed 2000 miles," "Finest Pennsylvania oil in the world."

The person familiar with oil advertising realizes that any of these claims may be to a degree true and to a degree false with respect to any given brand of oil reasonably near to standard or customary market quality, but that, whether true or false in a legalistic sense, they are more than likely

to be quite irrelevant. It is unwise of consumers ever to suppose that the statements of oil and gasoline advertisements represent a sincere attempt to assert a unique and important truth about a product. Any claim that is interesting or novel or sounds particularly convincing is likely to appear in the advertising of any product, primarily because a clever writer in an ad-agency has thought it to be an effective means for differentiating *his* nationally advertised high-priced product from the competition offered by another or cheaper one. (The principal aim of advertising and of much differentiation of trade brands is to make ordinary goods seem un-ordinary and so command higher prices than they otherwise would.)

"Demonstrations," which are specially designed to show superiority of any particular brand of oil, spark plug, spark intensifier or other automobile gadgets, vacuum cleaner, or electric lamp, should always be discounted. The whole purpose of a demonstration is to develop or "dramatize" an advantage or presumed advantage of one product, and suppress or disregard all of the respects in which it is no better than or actually inferior to others. Consumers often forget that special value or strength in one characteristic usually goes with weakness in another (as high selectivity in a radio goes with poor fidelity, and high illuminating efficiency in an electric lamp bulb is associated with short life). Salesmen are not fooled by such demonstrations because they have seen so many convincing displays put on for so many products that could not all be superior; but they are interested in making a sale, and "dramatization," however it distorts the facts, does make sales, since most consumers are unwary, or uninformed through lack of experience as to the particular expedients used in devising a "demonstration." Never forget that a clever adman or a salesman trained in "creative salesmanship" can always be found to contrive an equally convincing sales talk or demonstration for any brand whose maker puts the problem up to him.

* * * *

To go back to oils—from the consumer's point of view, such differences as exist between well-known brands are chiefly in the extent to which their viscosity decreases as the temperature rises. The following oils have been rated on that characteristic, which is the principal factor of importance in selecting an oil, for oils of present-day, well-known brands do not as a rule differ significantly in other respects. The smaller the change in viscosity due to temperature change, the more desirable is the oil. (For a fuller discussion of oils, the reader may refer to *A Consumer's Study of Automobile Gasolines and Lubricating Oils—SB 26*, 25 cents.) The oils which are rated *A* were superior in having a low degree of change of viscosity with temperature, those rated *B* were about average, and those rated *C* showed a considerable change. Oils which were found by test not to be of the S.A.E. grade claimed by the manufacturer were assigned a lower rating on this account than they otherwise would have received. *Stanolind*, however, merited a *C* rating without regard to the claimed viscosity. For brevity, these oils are noted as "misbranded" in the listing. ¶Samples were purchased in various sections of the country; a number of CR subscribers kindly furnished their services in selecting brands in greatest demand in their several localities. Except where otherwise noted the oils tested were canned oils S.A.E. 30 and were purchased by or for CR in original sealed tins. Prices given are per quart and include taxes where such are levied. The regions where the samples were purchased are indicated in parentheses immediately after the brand names, i.e., (PC), sample bought on the Pacific Coast; (MW), Middle West; (SW), Southwest; (FW), Far West; (W), West; (S), South; (NE), Northeast; (E), East. Samples purchased in Kentucky were too long delayed in delivery to be included, due to transportation company's error.

Ratings are cr 39.

A. Recommended

A-Penn (S) (Sold by The Great A. & P. Tea Co.) 18.5c; 2-gal can, $1.48.

Bureau-Penn (E) (Distrib. United Co-operatives, Inc.) 17.5c; 2-gal can, $1.40.

Cross Country (E), Cat. No. 28—4503 (Distrib. Sears, Roebuck & Co.) 17.6c including postage (Parcel Post, zone 2); 5-qt can, 69c plus postage. Sold also as *Penn Medal*.

Eastern States (NE) (Eastern States Farmers' Exchange) 15c; sold in 2½-gal lots only.

Esso Unifło No. 3 (E) (Standard Oil Co.) 35c.

Essolube (E) (Standard Oil Co.) 25c.

Golden Shell (E) 25c, (MW) 26c (Shell Oil Co.)

Good Penn (E) (S) (Distrib. Western Auto Stores) 17.4c; 2 gal can, $1.39.

Gulfpride (SW) (Gulf Oil Corp.) 35c.

Kendall (MW) (Kendall Refining Co.) 34c.

Koolmotor (S) (Cities Service Oil Co.) 35c.

Lionhead Purest Premium (PC) (Gilmore Oil Co.) 26c. (But note *B* rating of the (FW) sample.)

Lubrite (MW) (Socony Vacuum Oil Co., Inc.) 26c.

Panhard (E) (New York Lubricating Oil Co.) 25c.

Penn-Rad (E) (Radbill Oil Co.) 12.4c; 2-gal can, 99c.

Pure Penn (FW) (Union Oil Co.)

Quaker State (MW) (Quaker State Oil Refining Corp.) 36c.

Richfield Penn (FW) (Richfield Oil Corp.)

Sterling (MW) (Sterling Oil Co.) 31c.

Tydol (E) (Tide Water Associated Oil Co.) 25c.

Valvoline (MW) (Valvoline Oil Co.) 37c.

Veedol (W) 30c, (FW) (Tide Water Associated Oil Co.)

Wards 100% Pure Pennsylvania Standard (E), Cat. No. 461—7392 (Distrib. Montgomery Ward & Co.) 15.6c including postage (Parcel Post, zone 2); 5-qt can, 59c plus postage.

A. Recommended (contd.)

Wards 100% Pure Pennsylvania Supreme (E), Cat. No. 461—7365 (Distrib. Montgomery Ward & Co.) 17.6c including postage (Parcel Post, zone 2); 5-qt can, 69c plus postage.
Wolf's Head (MW) (Wolverine-Empire Refining Co.) 30c.

B. Intermediate

Amoco (E) (American Oil Co.) 25c.
Atlantic Quality (E) (The Atlantic Refining Co.) 25c.
Cities Service D (E) (Cities Service Oil Co.) 25c.
Conoco Germ Processed (SW) (W) (Continental Oil Co.) 30c.
General Lubrite (PC) (General Petroleum Corp.) 26c. Sold in bulk. Misbranded.
Gulflube (MW) (Gulf Refining Co.) 26c.
Havoline (W) 30c, (PC) 31c, (FW) (Indian Refining Co.)
Iso-Vis "D" (W) (Standard Oil Co.) 30c.
Lionhead (FW) (Gilmore Oil Co.)
Motoreze (W) (Union Oil Co.) 25c.
Panoco (S) (Pan-American Petroleum Corp.) 30c.
Purol (MW) (The Pure Oil Co.) 26c.
Richfield Pennsylvania S.A.E. 10-10W (W) (Richfield Oil Corp.) 30c.
Richlube (PC) (Richfield Oil Corp.) 26c.
Rio Lube (PC) (Rio Grande Oil Co.) 26c.
R. P. M. (W) 26c, (FW) (Standard Oil Co.)

B. Intermediate (contd.)

Shell Penn (FW) (Shell Oil Co.)
Sinclair Opaline (E) (Sinclair Refining Co.) 25c.
Spur (S) (Chalmette Petroleum Corp.) 20c. Sold in bulk. Misbranded.
Texaco (E) 25c, (SW) 25c, (FW) (The Texas Co.)
Trop-Artic (MW) (Phillips Petroleum Co.) 26c.
Zerolene (W) (Standard Oil Co.) 15c. Sold in bulk. (But note *C* rating of the (PC) and (FW) samples.)

C. Not Recommended

Aristo (FW) (Union Oil Co.)
Aristo Red Line (PC) (Union Oil Co.) 16c. Sold in bulk.
Cycol (FW) (Tide Water Associated Oil Co.)
Gold Crest (E), Cat. No. 28—4476 (Distrib. Sears, Roebuck & Co.) 11.1c including postage (Parcel Post, zone 2); 10-qt can, 79c plus postage.
Greenspot (FW) (General Petroleum Corp.)
MacMillan Ring-Free (PC) (MacMillan Petroleum Corp.) 26c.
Mohawk (PC) (Mohawk Petroleum Co.) 10c; 35c per gal. Sold in bulk.
Signal Western (PC) (Signal Oil Co.) 16c. Sold in bulk.
Stanolind (MW) (Standard Oil Co. of Indiana) 15c. Sold in bulk. Misbranded.
Sunoco (E) (Sun Oil Co.) 25c.
Westlube (FW) (Richfield Oil Corp.)
Zerolene (PC) 16c, (FW) (Standard Oil Co.) Sold in bulk

AUTOMOBILE INNER TUBES

THE deterioration of rubber with age is so generally well known that it seems hardly necessary to caution subscribers against purchasing inner tubes which have been on a dealer's shelf for any considerable period. Probably one of the best ways to insure getting fresh stock is to buy from a dealer known to have a fairly large turnover. In addition, the tube should be removed from its carton and examined carefully. If the tube tends to fall back easily into the same folds which it had in the box, it has quite probably lost some of its resiliency. A very old tube may even show slight surface checking or incipient cracks, especially when stretched a bit.

In the present test of inner tubes, every effort was made to obtain new stock by purchasing from large dealers or from factory outlets, especially requesting new material in each case. All samples were represented as being new (though such a claim may perhaps be expected in any event).

Neither the so-called "puncture-proof" (or "puncture-seal") nor the "super-safety" (or "blowout-proof") tubes have been included in this year's test. It has been reported, however, that the "puncture-proof" types (costing about 50 percent more than standard tubes) cause more heating of the tires than the standard tubes, and for this reason may even lead to blowouts during prolonged, fast driving in hot weather. Moreover, nails picked up by the tires may wear large holes (costly to repair) in the casing before their presence is noticed, since the tire may not go flat for some time. For service where it is of prime importance to reduce delays at the expense of extra operating costs, however, the use of the "puncture-proof" type of tube might be warranted in spite of these disadvantages. There is a second type which is not "puncture-proof," but said to be "blowout-proof." Such a tube is the *Goodyear "Lifeguard,"* and this, while admittedly reducing the danger resulting from blowouts, does not prevent leaks and punctures. In view of the improved roads which now offer reduced chances of tire failure, it is questionable whether the so-called "blowout-proof" tubes are worth their additional cost.

In carrying out the present test, dimensional properties of all tubes, i.e., length, thickness, inside diameter, and volume, were measured and compared with *Federal Specifications ZZ-T-721b.* Tube weight, not included in the Federal Specifications, was also measured. Five physical tests were then carried out, namely tests for tensile strength, elongation, set (persistence of length-change after stretching), hardness, and elasticity. Federal Specifications do not specify the last two properties. All physical tests were carried out on samples as received, and

after one, two, and three days' aging in a Bierer-Davis oxygen bomb. This method of aging, intended to simulate in a short time the action of heat and air on the rubber, is believed to give some indication of the change in properties of the tube under normal use. No such test, however, can give a reliable estimation of anticipated service life, unless the histories of the individual samples are known with respect to composition, cure, age, method of storage, etc. For the purpose of comparing the qualities of tubes of similar character and different brands, however, the accelerated aging method of test is believed valuable.

All tubes were rated on compliance with certain Federal Specifications and on performance under the various physical tests described above. Size of the tubes tested was 6.00 x 16. Ratings are cr 39.

A. Recommended

All-State Companion, Cat. No. 95-5300 (Distrib. Sears, Roebuck & Co.) $1.95 plus postage. Considerably superior in most properties to other tubes in test. **1**

Riverside Brown, First Quality, Cat. No. 64—317 (Distrib. Montgomery Ward & Co.) $1.95 plus postage. Maintained properties well in aging test. Surpassed by *All-State*, *Dunlop*, and *Firestone* in most properties but had good tensile strength and contained second largest volume of rubber. Amount of set was rather high. **1**

Dunlop Gold Cup Heavy Duty (Dunlop Tire and Rubber Corp., Buffalo, N.Y.) $2.80. Equal to *All-State* but for fact that set increased rapidly during aging test. Contained largest volume of rubber of any tube tested. **2**

Firestone High Speed Heavy Duty (The Firestone Tire and Rubber Co., Akron, Ohio) $2.85. Somewhat superior in quality to *Riverside* but contained smaller amount of rubber. **2**

General Heavy Duty (General Tire and Rubber Co., Akron, Ohio) $4.10. Slightly below average in quality, but ranked third in volume of rubber contained. Amount of set was rather high. **3**

B. Intermediate

Ariel Heavy Duty (Fisk Rubber Corp., Chicopee Falls, Mass.) $1.95. Volume of rubber relatively low. Considerably affected by aging test. **1**

Goodyear Pathfinder (Goodyear Tire and Rubber Co., Inc., Akron, Ohio) $1.50. Tube would rate *A* if based on quality of rubber only, but low volume of rubber would indicate that tube might be unduly stressed in service. **1**

Goodrich Standard Red (B. F. Goodrich Co., Akron, Ohio) $2.85. Volume of rubber low. Lost tensile strength in aging test. Other properties about average. **2**

Goodyear Heavy Duty Red (Goodyear Tire and Rubber Co., Inc.) $2.40. Contained next to lowest volume of rubber. Affected more than average by aging tests. **2**

Lee of Conshohocken Bevel Weld Heavy Duty (Lee Tire and Rubber Co., Conshohocken, Pa.) $2.25. Remarks under *Goodyear Pathfinder* also apply to this tube. Set high. **2**

Goodrich Silvertown (B. F. Goodrich Co.) $3.65. High original tensile strength dropped rapidly in aging. Most other properties held up well. **3**

C. Not Recommended

Seiberling Standard Service (The Seiberling Rubber Co., Akron, Ohio) $2. Low elongation, high hardness and set. **1**

Hudson (Pennsylvania Rubber Co., Jeannette, Pa.) $2.40. Except for volume of rubber, was found deficient in most important properties. Set exceptionally high. **2**

Kelly-Springfield Heavy Duty (Kelly-Springfield Tire Co., Cumberland, Md.) $2.95. Elongation was only property well maintained throughout test. Contained good volume of rubber. **2**

U.S. Royal (United States Rubber Products, Inc., N.Y.C.) $3.65. Rubber volume less than required by Federal Specifications. Quality of rubber poor. **3**

HOME OWNER'S PAMPHLET

A Review

Security for Home and Loan, a pamphlet of eighteen pages prepared by the Durable Woods Institute, will be of interest to anyone who is to build or repair a home with wood. The pamphlet discusses, for the most part, various grades and species of cedar, redwood, and cypress, and tells which ones are most suitable for various uses. It also gives very good directions for protection against termites. Natural resistance to decay of wood is confined to the heartwood. Careful reading of the pamphlet shows that only certain grades of cedar, redwood, and cypress are all heartwood. Most grades of these woods admit more or less sapwood which has no more resistance to decay than wood of the non-durable species. CR believes that while the statements of the pamphlet are biased in favor of the cedar, redwood, and cypress industry, they are in the main reliable. It is believed that the consumer, by observing those items in which the all heartwood grades tend to be recommended for two or three of the three classes of construction may safely use those recommendations on page 13 as an indication of when it is most important to use the relatively expensive, decay-resistant woods.

One who wants to be sure of buying naturally durable wood should specify and accept only all heartwood or go to the lumber yard and pick out the pieces himself. Fortunately there is a strong contrast in color between the sapwood and heartwood of cedar and redwood, so that the purchaser can see for himself what he is getting. Usually there is a strong contrast in color in cypress also, especially when both the heartwood and sapwood are in the same piece; but it takes some experience to tell the difference between heartwood of a very light color and sapwood which is a little darker than ordinary.

The pamphlet may be obtained free from Durable Woods Institute, 155 East 44 St., N.Y.C.

ELECTRIC FLATIRONS

NOT long after the appearance of CR's last report on flatirons, in which a certain fire hazard which they present and a way to diminish it were discussed, the following news item was printed in the New York *Sun*:

> LONDON, June 30 (A.P.)—Fire engines dashed to Buckingham Palace today after an unwatched electric iron had started a fire in one of the staff apartments alongside the royal residence.
>
> Grooms from the royal mews put the fire out before the engines got there. A floor was burned through.

This fire is only one of many reported in the news that might probably have been avoided by following the recommendation repeatedly made by CR that, for safety against fire, only thermostatically controlled irons should be used.

The flatirons in CR's test were carefully inspected and were tested for safety of electrical insulation, adequacy of heat output, accuracy of temperature control, temperature of handle, etc. The eight irons of conventional type were found in the main to be well-made appliances and it is deemed that any of them should give satisfactory performance in use; faults even of the irons rated *B* were mostly of a minor nature. All irons except the *Steem Electric* were thermostatically controlled and of a type designated by maker for use on a-c only. The weights varied from 3 pounds 10½ ounces for *General Electric Moderne* to 6 to 7 pounds for *Steem Electric* (the weight of which varied with the amount of water in its reservoir). Irons weighing approximately 4 pounds have been shown to iron satisfactorily most fabrics, except very heavy ones, and to be less tiring than heavier irons. All of the irons except the *Steem Electric* had a nominal rating of 1000 watts (a desirable figure, if controlled by an adequate thermostat, and superior to a lower wattage for average use). Areas of soleplates were in or very close to the preferred range of 25 to 30 square inches unless otherwise noted. Weights given in the listings are for the irons exclusive of cords and plugs.

Some irons had detachable cords; others had cords permanently attached at the side of the iron. While the detachable cord has the advantage of being more easily replaced when worn out, the permanently attached cord is becoming increasingly popular because it is less cumbersome and eliminates the plug element, which often becomes broken or deranged in service. The irons rated *A* gave somewhat better thermal performance than the irons rated *B*. Ratings are cr 39 except as noted.

A. Recommended

Wards Supreme Quality, Cat. No. 86—4980 (Distrib. Montgomery Ward & Co.) $6.45 plus postage. 3 lb 11 oz (3 lb 8 oz claimed). Cord permanently connected at side of iron. Soleplate made of aluminum alloy; found to be easily scratched. Thermostat of trigger (quick acting) type (desirable). Closely resembled *General Electric Moderne*, but had a slightly different handle and connecting cord and lacked the gadget called "button nooks" (little grooves cut in the point of the soleplate) of the more expensive iron. **2**

General Electric Moderne, Cat. No. 159F83 (General Electric Co., Bridgeport, Conn.) $8.95. 3 lb 10½ oz (3 lb 8 oz claimed). Cord permanently connected at side of iron. Soleplate made of aluminum alloy; found to be easily scratched. Thermostat of trigger (quick acting) type (desirable). Closely resembled *Wards Supreme Quality*, priced at more than $2 lower. **3**

Sunbeam Ironmaster, Model A-4 (Chicago Flexible Shaft Co., Roosevelt Rd., Chicago) $8.95. 4 lb (3 lb 12 oz claimed). Cord permanently connected at side of iron. Thermostat control conveniently located in handle. Handle remained exceptionally cool during operation of iron. **3**

B. Intermediate

Heatmaster De Luxe, Model 1065 (Distrib. Sears, Roebuck & Co.) $5.95 in retail stores; Cat. No. 20—1065 at $5.95 plus postage, from mail-order store. 4 lb (3 lb 12 oz claimed). Cord detachable and equipped with a long flexible spring supported by a short rod to be clamped to the ironing board for keeping cord out of the way. If found unsatisfactory at any time within 5 years, iron may be returned for a refund of purchase price less 10c for each month used. Considered a good guaranty if iron is in frequent use, but seems a poor guaranty for a consumer using an iron only occasionally. **2**

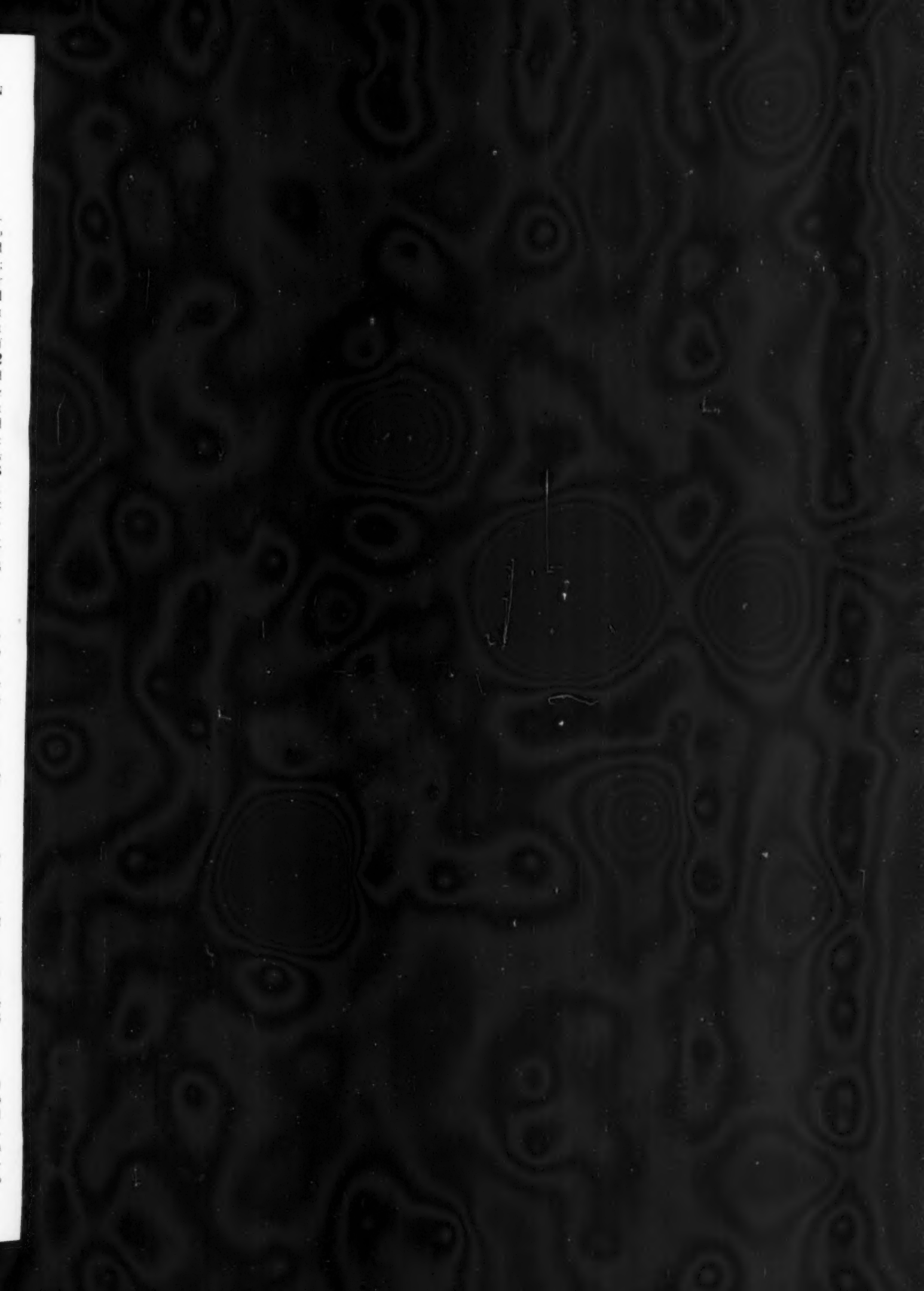
Proctor Blue Streak, Model No. 944 (Proctor Electric Co., Seventh St. and Tabor Road, Philadelphia) $6.95. 4 lb. Cord permanently connected at side of iron. Cord judged to be of unusually good quality. Handle remained exceptionally cool during operation of iron. **2**

Universal, Model E7183 (Landers, Frary & Clark, New Britain, Conn.) $6.95. 4 lb 2½ oz (3 lb 8 oz claimed). Cord permanently connected at side of iron. Area of soleplate somewhat small, approximately 23 sq in. **2**

Westinghouse Adjust-o-matic, Cat. No. LPC-4 (Westinghouse Electric & Mfg. Co., Mansfield, Ohio) $8.95. 4 lb 2 oz (4 lb claimed). Cord permanently connected at side of iron. Thermostat of trigger (quick acting) type (desirable). Temperature of control knob became much too hot and could burn user's hand. **3**

* * *

Manning-Bowman, Model No. 1489 (Manning, Bowman & Co., Meriden, Conn.) $6.95. 3 lb 13¼ oz (4 lb claimed). Cord detachable. Temperature of control knob became much too hot and could burn hand. Though the later tests were satisfactory, the iron when received failed to meet recognized standard requirements for safety of electrical insulation. Besides, due to



B. Intermediate (contd.)

accident of workmanship and inspection, a strand of connecting cord wire protruded through plug, thus connecting metal part of plug directly to power lines and presenting a dangerous shock hazard. **2**

C. Not Recommended

Cordless Iron (Electrical Products Co.) $11.95. pt 38 **3**

Steem Electric (Steem Electric Corp.) $9.95. 6 lb. Detachable cord of inferior grade and only 5¾ ft long. Power rated at 610 to 620 watts at 110 to 120 volts; actually consumed from 722 to 868 watts. Contained [illegible] to be filled with water to be used for generating [illegible] all holes near [illegible] being ironed, designed to make it unnecessary to sprinkle them or to use a dampened cloth for pressing. This type of iron would be useful if iron were properly designed and constructed. Due to design which permitted water to leak onto heating element, this iron presented a dangerous shock hazard. Iron became excessively hot when water was allowed to boil completely away; even if kept on stand provided, it presents a potential (though perhaps not very dangerous) fire hazard. Off the stand, as it surely would be at times, the iron would be a real hazard. In use, moreover, it must be kept in a horizontal position, for if much tilted, it ejects boiling water, which might constitute a serious hazard to children or others "in line of fire." Area of soleplate somewhat large, 33 sq in. **3**

"Console" Type Pianos

[illegible] *methods of test*
[illegible] *Accordingly the*
[illegible] *given here are not*
[illegible] *or measurements,*
[illegible] *"listening tests"*
[illegible] *keyboard instru-*
[illegible] *Music in one*
[illegible] *are presented*
[illegible] *well-qualified*
[illegible] *and deserves to*
[illegible] *those who con-*
[illegible] *of piano.*

THE most noticeable characteristic of the "console" type of piano is its small size. The height from the floor to the top varies for different models from about thirty-four to forty-seven inches. Of course, from a musical standpoint, one would not choose a console in preference to a grand or an upright piano; but where space is limited, many will perhaps find one of the better console pianos a satisfactory purchase.

Since there is not room in the console piano for the hammers to be much above the keyboard, a part of the action as commonly used in an upright piano is inverted to form what is called a drop or underslung action. This arrangement has been used in England for half a century, but has become common in this country only recently. Some manufacturers do not make a piano with the underslung action, and claim it to be unsatisfactory because of difficulty with regulation and faulty repetition. Experience of piano tuners and expert musicians has shown, however, that satisfactory actions of this type are made. In spite of the small size of these pianos, the tone is generally good.

To provide a reasonable safeguard when buying a piano of this newer and relatively untried type which upon trial may prove to be unsatisfactory, it is suggested that at the time of purchase a written, signed contract be obtained from the dealer, allowing exchange, at full valuation within a reasonable time, of the console piano for an upright piano of the standard type. Prices range from $175 to $550.

A. Recommended

Aerosonic (The Baldwin Piano Co., Cincinnati)
Pianino (Steinway & Sons, 109 W. 57 St., N.Y.C.)

B. Intermediate

Consolette 38 (W. W. Kimball, Kimball Hall, Chicago)
Minipiano 39 and *43* (Hardman, Peck & Co., 33 W. 57 St., N.Y.C.)
[illegible] *Richmond 36*, and *39* (Everett Piano Co., So. [illegible]com, Mich.)
[illegible]; *Spinet Style 34*, and *40* (Sohmer & Co., 31 W. 57 St., N.Y.C.)
[illegible] and *40* and *41* (Haddorff Piano Co., Rockford, Ill.)